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Illegal Wildlife Hunting and Trade in Southern Belize: An Assessment of Impacts and Drivers

Blakely Rice

SIT Graduate Institute, blakely.rice@gmail.com

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Illegal Wildlife Hunting and Trade in Southern Belize: An Assessment of Impacts and Drivers

Blakely Rice

PIM 75

SIT Graduate Institute

A capstone paper submitted in partial fulfillment of the requirements for a Master of Arts in Peacebuilding and Conflict Transformation at SIT Graduate Institute in Brattleboro, Vermont, USA.

Advisor: Bruce Dayton

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Student Name: Blakely Rice

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Abstract

The use of wildlife as a resource is a common practice in all countries around the world, however, illegal activities are contributing to various environmental and social altercations amongst the involved communities and individuals, both directly and indirectly. This has led to the generalized global narrative on illegal wildlife hunting and trade as a “good vs. bad” convention. Although legal frameworks are in place to manage hunting and trade sustainably, governments and organizations often find themselves struggling to protect wildlife from illegal hunters, often facing dangerous situations thus the establishment of militarized conservation units. To date, most of the focus is on the African continent and Southeast Asia, with less attention on other biodiverse locations, such as Central and South America. Information about illegal wildlife hunting and trade is increasing in Central and South America but the data is still lacking in both qualitative and quantitative analysis. Frameworks such as Conflict Sensitive Conservation and Conservation Conflict Transformation have been developed to address the complex factors impacting wildlife conservation. In Belize, previous studies have examined the legal and social aspect of wildlife hunting and trade, but there remains a void of information regarding the activities. Herein, this study explored some of the causation and subsequent results of illegal hunting and trade in Southern Belize through semi-structured interviews with conservation practitioners and hunters; ten stakeholders from Stann Creek and Toledo districts in Southern Belize were interviewed. The findings reveal that all participants think hunting in Belize is unsustainable, while five participants cited enforcement as the biggest thing needed to reduce this activity, three cited more farming support and two cited education; additionally, three participants mentioned that starting a gibbon ranching program could help reduce the pressure on wild populations. Eight participants addressed livelihood or the need for additional income as the main motivation for hunting and trading illegally, while hunting for identity was second and protein sources was third. Interestingly, all participants discussed the hunting of Paca (*Cuniculus paca*), known as gibbon in Belize, as the main hunted species, suggesting that animals that have a legal hunting season are hunted illegally more than other species that are considered non-huntable. This finding is different from other illegal hunting studies that focus on animals that are completely off-limits for hunting. Eight participants mentioned crocodiles (*Crocodylus acutus* or *Crocodylus moreletii*) as the species that is hunted the most that does not have a hunting season; participants did not specify a species. Parrots, namely the endangered Yellow Head Parrot (*Amazona oratrix*), were the species mentioned the most when asked about animals captured for the pet trade. Lastly, recommendations are provided for short, medium and long term initiatives to address this issue from both a technical and behavioral standpoint.

Illegal Wildlife Hunting and Trade in Southern Belize: An Assessment of Impacts and Drivers

Hunting is a common practice around the world as it holds cultural, social, economic and/or political importance for many people and communities, and will continue to do so for the foreseeable future. However, hunting has become a major threat for long-term environmental and wildlife conservation, as unsustainable and unsafe practices have had detrimental impacts on biodiversity, wildlife populations, economic growth, poverty, security and cultural practices (Adams et al. 2004; Bashari et al., 2017; Douglas & Alie, 2014; Duffy et al., 2016; Groff & Axelrod, 2013; Holmes, 2007; Lawson & Vines, 2014; Lindsey et al., 2013; Reuter & O'Regan, 2016). Globally, the narrative on illegal wildlife hunting and trade is incomplete as it often generalizes the problem in a binary “good vs, bad” convention, which fails to acknowledge the complex and diverse needs and motives of people who participate in this activity. Additionally, most of the focus is on the African continent and Southeast Asia, with less attention to other biodiverse locations, such as in Central and South America. Information about illegal wildlife hunting and trade is increasing in the Americas but the data is still lacking in both qualitative and quantitative analysis (Foster et al. 2014; Goyenechea & Indenbaum, 2015).

It is difficult to quantify the illegal wildlife trade due to its widespread practice and various motives, yet it is projected that the illegal wildlife trade is just behind drugs, weapons, and human trafficking in terms of costs globally (Risdianto et al. 2016). The estimated annual global value of wildlife trafficking is thought to be between \$7 billion and \$23 billion, this wide range in values further supports the difficult nature of quantifying this activity (Goyenechea & Indenbaum, 2015). Large estimations such as these provide a valuable global context, however, to truly begin working on this we must focus on individuals, their communities and the needs that are driving these numbers.

Several new frameworks have been developed over the past few years to address conflict in conservation work, these include Conflict Sensitive Conservation (CSC) developed by the International Institute for Sustainable Development, and Conservation Conflict Transformation (CCT), developed by Human-Wildlife Conflict Collaboration, soon to be the Center for Conservation Peacebuilding (CPeace). Conflict Sensitive Conservation can be understood as “conservation programming and implementation that takes into account the causes, actors and impacts of conflict in order to minimize conflict risks and maximize peacebuilding opportunities” (Hammill et al. 2009). While Conservation Conflict Transformation is defined as a principal that aims to “positively transform often unseen and destructive social conflicts that underlie many conservation efforts but have, heretofore, largely remained blind spots undermining long-term conservation progress” (Madden and McQuinn, 2014).

Conflict sensitivity is a practice that creates awareness and understanding around yourself and the work you do. This is gaining traction in conservation work as more initiatives seek to understand the social, cultural, political and economic factors underlying conservation issues. International Alert (2004) has outlined three aspects of conflict sensitive practices, they are the following, 1) understand the context in which you operate; 2) understand the interaction between your intervention and the context; and 3) act upon the understanding of this interaction, in order to avoid negative impacts and maximize positive impacts. It is the practice of including conflict analysis into your creation and assessment of your initiative. Therefore, conflict sensitive conservation highlights the links between conservation and conflict, and can be understood as, 1) conservation can contribute to or cause conflict; 2) conservation can be negatively affected by conflict; 3) conservation can be a mechanism for conflict prevention and peacebuilding. This is

important because it shows the growing understanding that conservation has a larger role to play in conceptualizing and acting on the root causes of environmental issues.

Similarly, John Paul Lederach (2003) defines conflict transformation as a way “to envision and respond to the ebb and flow of social conflict as life-giving opportunities for creating constructive change processes that reduce violence, increase justice in direct interaction and social structures, and respond to real-life problems in human relationships.” It is an opportunity to look at conflict as a regular part of human life, and when applied to conservation, can broaden the way we understand environmental conflicts and expand the way interventions are created.

Conflict is important to address within conservation for several reasons. First, humans are not separate from the natural world and thus are impacted and impact decisions made about it. Secondly, most environmental conflicts are proxies for deeper human/social conflicts that manifest over the respective issue. Thirdly, conservation without conflict sensitivity often address technical approaches to conservation such as building fences to keep wildlife out of crops but not deeper rooted needs such as extreme poverty. Lastly, current conservation models often fail to acknowledge the social and psychological needs such as dignity, freedom, social and emotional security that can impact conservation initiatives (Madden and McQuinn, 2014). At its base conservation is focused in biology, most conservationists are concerned with understanding, protecting or managing the needs of wildlife and habitats and less concerned with understanding that relationship in regards to humans (Madden and McQuinn, 2014). However, the social relationships of humans can generally be understood as the root causes for environmental conflicts and, if not fully recognized, will undermine conservation efforts.

Many assessments look at large over-arching reasons such as poverty and war as drivers for illegal wildlife hunting and trade. However, these are not the only factors that impact human behavior when it comes to illegal wildlife hunting and trade, and using a framework such as conflict transformation can provide us with the tools to understand the other factors impacting conservation. As will be discussed in further detail, there are a variety of issues that impact an individual or communities' decision to participate in illegal activities. As such, this study aims to unpack some of these motives in relation to wildlife hunting and trade in Belize and gather preliminary information about root causes of illegal wildlife hunting and trade. Additionally, it aims to contribute to the foundation for data that can be used to help conservation practitioners understand the activity.

Literature Review

Bushmeat, Poaching, Illegal Wildlife Hunting and Illegal, Unreported, Unregulated

What is the difference between bushmeat, poaching, illegal wildlife hunting and Illegal, Unreported, Unregulated (IUU). Why are there different terms and are they different in practice? All four terms are activities that are outside the wildlife use laws of the given area, and they all refer to illegal activity but have some nuanced differences.

Bushmeat is a term most often used in various countries included in the African Savannah ecosystem, and refers to the pursuit and killing of non-huntable wildlife for consumption, both for personal use and for the market (Lindsey et al. 2013). Generally, bushmeat describes the taking and/or use of meat from illegally hunting. This term differentiates from the wildlife meat hunted legally, which is referred to as "game meat" (Lindsey et al. 2013).

Poaching is a term that is used globally and it is not necessarily limited to one region, and is a practice that is generally understood when spoken about in wildlife conservation. Like

bushmeat, it also describes various activities related to killing or taking, or attempting to take or kill wildlife, for either personal or commercial use. It does not generally include harassment of animals, although hunting and taking are forms of harassment.

Illegal hunting describes the same activity as poaching and bushmeat, yet also includes harassment of wildlife such as capture for the pet trade or attempting to capture or kill; it is often used to describe those illegally hunting with a permit. Generally, those who hunt illegally with a permit are hunting out of season, hunting more animals than their permit allows, hunting the wrong size/gender of animal and/or hunting outside of designated hunting areas.

Lastly, IUU is a term that was first introduced by the Food and Agricultural Organization of the United Nations (FAO). IUU has been used only to describe fishing activities but is now starting to encompass terrestrial hunting as well. If IUU is to be used for terrestrial hunting, it will need to be adapted to include definitions for terrestrial environments and how that may address local, national and international hunting activities (FAO, 2002).

Each term above comes with socio-cultural implications, for example, hunters in California have been quite vocal about media publications that use “hunter” and “poacher” interchangeably. The term “poacher” touches on a deeper identity for those who hunt legally and do not want to be associated with those who engage in illegal hunting (Tobin, 1995). In addition, the terms bushmeat and poaching are often used to describe the hunting activities of native or local populations of people who historically hunted wildlife, but were excluded by the creation of new laws, conservation areas and/or national parks. Several scholars have made a conscious decision to not use the word “poaching” or “poacher” when talking about illegal wildlife hunting due to the different legal frameworks that exist on wildlife use. It is an effort to acknowledge that

some hunters have become “poachers” simply because of unjust laws and/or during colonial rule (Duffy et al. 2016).

With various terms and practices, it is important to remember that illegal wildlife hunting occurs on a continuum and refraining from oversimplifying the activity is vital. There are various ways to hunt illegally coupled with complex motivations that make it hard to define in a singular manner. As the next section will explore, our collective conceptualization of why people around the world hunt and trade wildlife illegally is important as it can impact conservation initiatives.

Causation of Illegal Wildlife Hunting and Trade

Most of the environmental problems facing countries like Belize are not necessarily out of lack of concern about the environment, but are manifestations of deeper drivers such as poverty, identity and lack of education. Illegal wildlife hunting and trade is often described in a way that reduces agency, individualism, power and voice which are some factors that greatly impact whether a person will participate in illegal wildlife hunting/trade. For example, MacDonald (2005), found that a program from the IUCN in Northern Pakistan to address declining ibex populations, focused on creating a trophy-hunting program to reduce the number of local hunters. The objective was to sell hunting permits to international hunters and the proceeds would go to the communities and government. The program focused on a monetary fix, which did prove to help some of the communities, however, it did not curtail the local ibex hunters. Ibex hunting in this region had been carried out by locals for hundreds of years and came with a sense of prestige. This program failed to see that hunting was not only monetarily motivated but deeply connected to identity and self-actualization.

Other examples include people participating in the bushmeat trade as a form of resistance to culturally insensitive conservation laws (Holmes, 2007) or simply as a taste preference (Lindsey et al. 2013). A study by Bashari (2017), found that within one community in

Afghanistan, motivations for hunting illegally can vary widely and should not be generalized in policy or conservation programming. Additionally, illegal hunting practices have been seen to increase during culturally and/or religiously important holidays such as Ramadan (Risdianto et al. 2016). Illegal hunting practices in Chiquibul National Park in Belize have been tied with illegal *xaté* harvesting (leaves from 3 species of palm tree, popular in the floral industry), suggesting that illegal hunting is a secondary activity for those who need food while out in the forest (Bridgewater et al. 2006). Lastly, several studies also link the value that illegal hunting can bring food security and nutritional needs to many communities that cannot afford meat (Groff and Axelrod, 2013; Lindsey et al. 2013); although the security and income that are generated through these activities are temporary and not guaranteed (Robinson, 2017).

Even with these deeper assessments in the field many conservationists are still focused on income generation as a cause. Roe (2014) found that 70% of published papers addressing the link between poverty and biodiversity used income as the primary measure. This is important for practice because it shows that the focus on the link of conservation and poverty is income, which is likely why there is a large concentration of initiatives that aim to create alternative livelihoods for those hunting or trading illegally. Conservation programs that try to create alternative livelihood options for individuals are not wrong in their efforts, but data is showing that often conservation programs rarely create full alternative solutions as there is a focus only in creating additional sources of income (Duffy et al. 2016). In addition, if conservation initiatives are only focusing on income generation as a solution then they are likely missing a large component of why people are illegally hunting and trading wildlife.

Lastly, it is important to talk about how we view and interact with poverty when it comes to wildlife conservation. Wildlife conservation and poverty reduction can conflict (Adams et al.

2004), but are closely linked and must be addressed together. Conflicts between poverty reduction and wildlife conservation generally manifest when conservation initiatives focus on physical changes such as the building fences to keep wildlife out of crops or creating national parks and restricted areas. However, they rarely result in long-term transformation because they do not focus on the root causes such as identity or self-actualization. Many conservation initiatives are acknowledging that they need to have a stronger understanding of human needs and behavior to have a meaningful impact. To understand human needs in this context is multidimensional and demonstrates that conservation projects cannot overturn the social, economic, and political factors that drive illegal wildlife hunting and trade on their own; they need to incorporate a more holistic multidisciplinary approach (Duffy et al. 2016).

Belizean Context

The current population of Belize is 366,954 and is the least populated country in Central America (World Bank, 2016), it shares terrestrial borders with Guatemala and Mexico, and marine borders with Guatemala, Mexico and Honduras. This study focuses on two districts in Southern Belize, Stann Creek and Toledo, which are the least populated districts at 34,323 and 30,785 respectively (Statistical Institute of Belize, 2010). Belize has made major efforts to designate protected areas, designating approximately 43% of the mainland as national, private or candidate protected areas, while only 17% of the mainland is legally protected against wildlife harvests (Foster et al. 2014).

In Belize, studies have been done to understand wildlife hunting and trade but there is still a void of information regarding the activity. Currently, studies are trying to create baseline understanding and database about this activity in Belize while also providing some recommendations for future studies (Perez et al., 2009; Groff and Axelrod, 2013; Foster et al.,

2014; Harvey et al., 2016). Below will outline the legal frameworks in place for wildlife protection in Belize and how it plays out for hunters.

Legal Framework in Belize

Hunting is managed in a legal context that essentially puts the “ownership” of wildlife with the state or country (Lindsey et al. 2013). Many countries, including Belize, have a permit system for wildlife that can be hunted within given seasons, while other wildlife is strictly off limits. Governmental institutions that create the legal and enforceable framework for wildlife hunting and use generally look to several factors to determine what is huntable and what is not. First, culturally significant wildlife is considered when assessing what is already used or has been used historically. Second, global conservation and wildlife trade organizations, such as Convention on International Trade of Endangered Species (CITES) and The International Union for Conservation of Nature and Natural Resources (IUCN), rank species based on current peer reviewed studies and data. Rankings such as ‘Endangered’ or CITES ‘Appendix I’ have specific meanings and requirements behind them making it relatively straight forward to assess whether a population can handle any type of harvesting. Many countries look to these global assessments to measure their wildlife populations from, for example, a species may be endangered globally but in a specific country it may only be vulnerable. These rankings are only as good as the available data on a given species and many species globally are data deficient or are facing threats that are changing their populations faster than researchers can record. Thirdly, many wildlife laws stem from colonial laws and regulations before countries gained independence. There is often a strong continuity with pre-and post-independence environmental laws where the boundaries remain unchanged, people displaced and access to certain resources limited (Goldstein, 2005). Fourthly, wildlife hunting laws are also closely tied to mating, nesting, birthing and rearing seasons for wildlife. The objective with having specific seasons for each species is to give the population

time to reproduce and successfully rear young so that the population may continue to grow and be available for hunters in the future. Lastly, many species that are hunted by humans are also prey species for predators such as pumas and jaguars (Foster et al., 2014) and therefore, sustainable management of hunting species is imperative.

Over-arching wildlife conservation laws in Belize were created in 1981 when it gained independence from England. The Wildlife Protection Act (1981) provides a legal and enforceable framework to regulate hunting and commercial wildlife activities of all non-domesticated animals in Belize. Additionally, the National Park System Act (1981), provides a framework for large-scale protection and regulation of various places in Belize. Before 1981 environmental laws were not comprehensive or enforceable and there was a long tradition of both trophy and traditional hunting (Wilk, 2005). Even after the enactment of The Wildlife Protection Act, there was little enforcement. In 2000, the Government of Belize made amendments to the Wildlife Protection Act to include a “schedule” of species that are fully protected against hunting and/or trade. This outlines the regulations that controls hunting such as closed hunting areas, the creation of hunting seasons and the prohibition of hunting certain genders/size of huntable species (Lyon, 2013).

Additionally, Belize has signed CITES, which aims to regulate trade in wild animals and plants in a way that does not threaten their survival. CITES is a framework to guide all signed parties in best practices regarding their wild flora and fauna. CITES is legally binding but does not take place of national laws (Belize Fisheries Department, 2013).

The legal options for resource protection in Belize lies with the Ministry of Agriculture, Fisheries, Forestry, the Environment and Sustainable Development who is responsible for the enforcement of the Environmental Protection Act and the regulations made under it (Department

of the Environment, 2013); the Wildlife Protection Act also falls under this ministry. The Belize Forest Department (BFD) is housed under this ministry and is the main agency that enforces and implements The Wildlife Protection Act. In the Belize Wildlife Protection Act (2000), hunting is defined as:

“to kill, take or molest by any method and includes attempting to kill, take or molest by any method any species of wildlife” (p. 6)

and wildlife is defined as:

“all undomesticated mammals, birds and reptiles and all parts, eggs and nests of any of these wildlife forms” (p. 6)

Until recently, the Belize Forest Department had one wildlife officer for the entire country, and just recently expanded to six officers, one for each district. The wildlife officers/game wardens are responsible for the enforcement and protection of wildlife and relevant laws. Depending on the resources at each Forest Department station, the wildlife officer may also have other responsibilities that take them away from focusing on wildlife. For example, the wildlife officer at the Savannah Station often goes out on 2-3 week long patrols with the Belize Defense Force to conduct surveys of economically important tree species, such as Mahogany, and search for people logging illegally. This means that one of the other officers at the station will respond to wildlife issues if they can, ultimately, this scenario represents a stretching of resources that can impact the effectiveness of wildlife law enforcement.

Outline of Wildlife Protection Act in Relation to Hunters and Buyers in Belize

As mentioned above, the Wildlife Protection Act (WPA) outlines the various parameters of wildlife use in Belize. To determine what species are huntable from those that are completely off limits a “schedule” was created that lists the non-huntable species and the birds that can be hunted. The WPA also outlines how Belizeans and non-Belizeans can legally hunt, what happens if someone hunts/trades illegally, and the measures that wildlife officers/game wardens can take.

There are several important measures that need to be brought out here; first, there are three types of hunting permits available in Belize.

- 1) Hunting permit for Belize residents (1 day or annual);
- 2) Hunting permit for non-Belize residents;
- 3) Hunting permit for particular species for education or science (special cases that require a research permit and proposal).

Hunting permits only allow personal consumption, if someone wants to sell or deal wildlife they must obtain a dealers' license, which is available in 3 day or annual options (Wildlife Protection Act, 1981). To apply for a hunting license a person must go to one of the Forest Department Stations in their district, which could be problematic for those hunters who are far away from the station, don't have transportation and/or don't have access to the internet or phone to learn about the hunting laws.

If a person, or group of people, is caught hunting, in possession of and/or dealing wildlife illegally the wildlife officers/game wardens reserve the right to confiscate, arrest and/or fine them. The WPA stipulates that if someone is found guilty of a wildlife offense they can be fined up to \$500.00 BZD. If they commit another offense within 5 years of a previous offense they can be fined up to \$1,000.00 BZD and given no more than 6 months in prison (Wildlife Protection Act of 1981, 2000). For people who kill or capture wildlife for self-defense or defense of property they must report it within one month to the nearest game/wildlife officer and pay any fees relevant under the WPA. Additionally, they may not eat and/or sell any part of the wildlife they have killed/captured, all wildlife killed/captured in this manner is automatically property of the state (Wildlife Protection Act of 1981, 2000). This can be problematic in practice for several reasons. First, the reporting period of one month is quite long, especially for animal tissues that break down quickly. Second, if the person is still likely to be fined after reporting a kill/capture

then the chance of them reporting is low to avoid any fees. Third, these stipulations make it more desirable to not report at all, with no reporting they can/may keep the animal for their own use.

Currently, the only way wildlife may be traded in and out of Belize is through a special permit through the Forest Department; as of now there is no legal, regulated market for the trade of wildlife in Belize (Wildlife Protection Act of 1981, 2000). However, this does not include economically important animals such as lobster or Queen Conch, which do have a legal, international trade markets.

Access to hunting information is limited and can be confusing for many people. Even if hunting laws are outlined online this does not guarantee that every hunter will know about them or even know how to learn about them. Online information about hunting in Belize is limited, the Belize Forest Department's website is currently down and there is no timeline for when it will be completed. There are a few online forums that provide some hunting information, but knowledge of rules and regulations is mostly through word of mouth, radio or TV.

Regardless of all the regulations laid out in the Wildlife Protection Act, if a person is not aware of these laws then they serve little purpose in protecting wildlife and people. This is not the only obstacle in understanding and transforming illegal wildlife hunting and trade, the deeper drivers that move people to participate in these activities are seldom discussed when exploring options for conservation programs. Lastly, if illegal hunting and trade is viewed with a singular focus then it will limit the ability for organizations and communities to create lasting change and address deeper needs of those most impacted.

Conclusion

Illegal wildlife hunting and trade is an activity that occurs on a continuum and is not static. Future interventions will need to include the concepts of privilege, power, voice and agency along with conservation goals. It is important that conservation practitioners

simultaneously acknowledge that poverty greatly impacts individual freedoms, such as power and agency, while also recognizing that those considered poor have agency within the constraints of social systems in place (Sen, 1999). This contradiction is difficult to pin down and represent in quantitative methods, but it is an important part of understanding why individuals and communities participate in illegal wildlife hunting and trade. The larger, global numbers do not capture this contradiction and thus miss the opportunity for deeper understanding.

Holistic wildlife management, coupled with practices such as Conflict Sensitive Conservation, can guide program development to not only acknowledge factors such as power and poverty but understand them better to build meaningful and empathic relationships with various stakeholder groups. When we look at why people participate in these activities it is necessary to look at the social, cultural, political and economic influences as these often drive human behavior and thus impact how humans view and use the environment.

Research Methodology

This study was conducted in Southern Belize, focusing on two districts, Stann Creek and Toledo. These districts were chosen for two reasons. First, proximity for PI to travel to participants was more accessible than other locations. Secondly, there is less information about this activity in Toledo and Stann Creek as both districts have been left out of sampling locations in other studies (Groff and Axelrod, 2013; Foster et al., 2014). It assessed why people chose to hunt, both legally and illegally, and the underlying drivers impacting someone's decision to participate in this activity. This study is an action research project meaning that the information collected is intended not only to inform but also assist in improving the current actions being taken (Sagor, 2000). I used an inductive approach for this study; the intention is not to test a hypothesis against data but to assess critical belief systems in association with wildlife hunting

and trade. The research is a qualitative assessment of wildlife hunting and trade in Southern Belize through semi-structured interviews to listen to personal accounts from those directly impacted by this activity. The data was collected through this process to create a preliminary understanding of what the market looks like here, as there is very little numerical information about hunting and trade in Belize.

Interviews

Ten interviews were conducted in the Stann Creek and Toledo Districts of Southern Belize between June 18th and July 7th 2017; the interviews were split into two stakeholder groups: hunters and conservation practitioners. Interviews were only given by the principal investigator, Blakely Rice, however, some of the initial connections were made with various colleagues to help with introductions and building trust; interviews were conducted in English. The principal investigator traveled to participants to conduct interviews, participants suggested locations that they may be more comfortable with, however, the PI also suggested locations when needed. Interviews happened during normal business hours between 8:30AM to 5:00PM, and occurred during the week. Once location and time were decided the PI shared the interview schedule with the CRC team to ensure a measure of safety for all participants and investigators. Interviews were transcribed and coded using NVIVO software through inductive coding, the codes were generated from the data.

Preliminary Data

The data is both qualitative and quantitative in nature. Qualitative data was coded using NVIVO software to find themes and analyze the interviews. Quantitative data came from those questions regarding economic and market themes such as how much a hunter can sell an animal for or how often animal products are sold or eaten. The data was compiled into relevant, thematic tables and will be used to give a picture of what the trade/market looks like in the region, this

format will be accessible for others to use upon request. All final data available for others to use will be coded for anonymity, access to the raw data is limited to Blakely Rice.

Results

Economic

Seven species were mentioned regarding price for purchasing, either to sell live for the pet trade or dead for various parts, both for trade and consumption. Table 1 shows the list of species that were mentioned with prices and descriptions for use, prices listed in Belize Dollars (BZD) and United States Dollars (USD) for reference.

Table 1: Cost Associated with Various Wildlife

Species	Cost in BZD	Cost in USD
Crocodile	Large tooth - \$100; Tooth in jewelry - \$1,000; Whole crocodile - Croc tail - \$200-400	Large tooth - \$50; Tooth in jewelry - \$500; Croc tail - \$100-200
Deer	Whole deer (unprocessed) - \$100 Certain cuts (processed) - \$5-6/pound	Whole deer (unprocessed) - \$50 Certain cuts (processed) - \$2.50-3/pound
Fish	Jacks and Grunts - \$2.50-3/pound Snapper, barracuda, snook - \$4-6/pound, fillets for up to \$8	Jacks and Grunts - \$1.25-1.50/pound Snapper, barracuda, snook - \$2-3/pound, fillets for up to \$4
Gibnut	Plate at restaurant - \$25.00 In Placencia – \$9-10/pound Other villages (non-tourist) - \$5-7/pound	Plate at restaurant - \$12.50 In Placencia – \$4.5-5/pound Other villages (non-tourist) - \$2.50-3.50/pound
Lobster	Cooperative in Placencia - \$25 Illegal Market - \$10	Cooperative in Placencia - \$12.50 Illegal Market - \$5
Scarlet Macaw	Adult - \$5,000 Chick - \$450	Adult - \$2,500 Chick - \$225
Yellow Headed Parrot	Adult - \$600 - 1,000 Chick - \$200-500	Adult - \$300 - 500 Chick - \$100-250

These numbers need to be normalized with other values and costs reported and should be viewed as a preliminary assessment of the market, however, they do provide an insight into pricing values perceived or learned within various communities and contribute to the baseline understanding of this market in Southern Belize.

Species Hunted and Sustainability

There were 21 different organisms mentioned throughout the interviews, Table 2 includes the organisms mentioned in either hunting/fishing and/or trade activities, if they have a hunting/fishing/harvest season, how many interviews mentioned them, what district they were mentioned in and the current conservation status in Belize. Some of the animals and trees mentioned were not specified with species. If multiple species exist in the mention of an organism, such as peccary, both species information is included for context. Six of the 21 different species were only mentioned in the Stann Creek district, four of them are marine species (conch, lobster, sea cucumber and sea turtles), the other two are terrestrial mammals (coatimundi and ocelot). Two of the 21 were only mentioned in interviews from Toledo, raccoons and snakes. Gibnut was the animal that had a legal hunting season that was talked about the most and preferred the most by participants. Eight participants mentioned crocodiles making it them the most hunted animals without hunting seasons; a species for crocodile was not specified during any of the interviews. Five participants mentioned that the main market for crocodile is the Chinese - Belizean community, sometimes they request for a hunter to go get them one or if a hunter or fisherman is out and they see a crocodile they will likely kill it and sell it to the Chinese – Belizean community. No one mentioned if there were any people in the Chinese – Belizean community that hunts, they only purchase from other hunters.

All participants did not think that hunting was sustainable in Belize right now, and several mentioned that they believe they are moving in the right direction with increased environmental outreach and education. When asked whether an endangered classification would impact someone’s choice to hunt an animal all participants said that it would not deter people from hunting/trading it. Additionally, when asked if they thought people understood the purpose of sustainable use the answers were mixed. Five participants said that people do understand about sustainable use but chose not to listen or participate in that practice. The remaining five said that people did not understand about sustainable use and that maybe hunting would be more sustainable in Belize if there was increased education. Six of the participants acknowledged that it is not that people do not care but that there is a stronger need such as sustenance driving their hunting practices. In addition, the participants said that people will generally shoot whatever they see; if they go out to hunting they want to come back with something. Three participants mentioned that many hunters do not pay attention to whether or not the animal they see is pregnant or has young, they will also shoot multiple animals if they see them.

Table 2: Organisms Hunted, Fished or Traded

Species	Hunting/Harvest Season	Interview mentions	Location	Population Status in Belize
Nine-Banded Armadillo	Yes	2	T and SC	Least Concern CITES – N/A
Birds (Chachalaca / Curassow)	Yes – Chachalaca No - Curassow	3	T and SC	Chachalaca – Least Concern CITES Appendix III (Guatemala and Honduras) Curassow (Great and Northern Helmeted) – Vulnerable CITES Appendix III (Guatemala, Costa Rica, Honduras and Colombia)

Coatimundi	No	1	SC	Least Concern CITES Appendix III (Honduras)
Conch	Yes	2	SC	Data Deficient (Endangered in USA) CITES Appendix II
Crocodile	No	8	T and SC	Morelet's – least concern, under review CITES Appendix II American – Vulnerable (study beginning 2018) CITES Appendix I
Deer	Yes	10	T and SC	Red-Brocket – data deficient CITES Appendix III (Guatemala) White Tailed – least concern CITES Appendix III (Guatemala)
Fish (snook, snapper, tarpon, tilapia) *species include are two most economically important snapper species	Yes - Snapper, tilapia, snook No- Tarpon catch and release	5	T and SC	<u>*Snapper:</u> Grey – Least Concern CITES – N/A Yellowtail – Data Deficient <u>Other fish:</u> Tilapia – invasive from farming, can harvest whenever <u>Snook:</u> Mexican - Data Deficient Common – Least Concern Tarpon – Least concern Fat – Least Concern Large-scale Fat – Least Concern Swordspine – Least Concern

				Tarpon – Vulnerable CITES – N/A
Gibnut (Paca)	Yes	10	T and SC	Least Concern CITES Appendix III (Honduras)
Iguana	Yes	7	T and SC	Green – Endangered CITES Appendix II Black-spiny Tailed – least concern CITES – N/A
Jaguar	No	8	T and SC	Near Threatened CITES Appendix I
Lobster (Caribbean Spiny)	Yes	2	SC	Data Deficient CITES – N/A
Macaw (Scarlet)	No	2	T and SC	Critically Endangered (<i>BZ</i>) CITES Appendix I
Manatee (West Indian)	No	4	T and SC	Endangered (<i>BZ</i>) CITES Appendix I
Ocelot	No	1	SC	Least Concern CITES Appendix I
Yellow Headed Parrot	No	5	SC and T	Endangered CITES Appendix I
Peccary	Yes	9	SC and T	White-Lipped Peccary – Vulnerable Collared Peccary – Least concern
Raccoon (Northern)	No	1	T	Least concern CITES – N/A
Sea Cucumber	Yes	1	SC	Data Deficient
Snakes (Boa constrictor)	No	2	T	Not Evaluated CITES Appendix II
Tapir	No	8	T and SC	Endangered CITES Appendix I
Trees (Economically important such as Rosewood and Mahogany)	No – Honduran rosewood Yes – Mahogany	3	T and SC	Honduran Rosewood – not evaluated CITES Appendix II Mahogany – Vulnerable CITES Appendix II
Turtle (both fresh and sea)	Yes- Hicatee No - any sea turtle	7	T and SC	<u>Fresh Water:</u> Hicatee – critically endangered

<p><i>*only three species seen regularly in BZ waters</i></p>			<p>(Sea Turtles only in SC)</p>	<p>CITES Appendix II <u>Sea Turtles*</u>: Hawksbill - Critically Endangered Green - Endangered Loggerhead - Vulnerable</p>
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Species that have “N/A” next to CITES status in fifth column do not have an official CITES ranking. Species that have *BZ* next to their conservation status indicate the specific conservation status in Belize, if *BZ* is not located next to the conservation status then it relates to the current, global conservation status.

Motives for Hunting and/or Trade

Nine motives were generated through the coding process of the interviews. Table 3 shows the motives in order of times mentioned by participants. Eight of participants said that livelihood or additional income was the main reason for people to participate in illegal wildlife hunting and trade while identity and culture was second with additional food source as the third reason. Many participants mentioned motives together such as income and additional food and it should be noted that these top three motives are intertwined and hard to value one more than the other. Livelihood and Additional Income included those response that spoke about careers, hunting for money either full time or opportunistic and if it impacted their personal finances. Identity and culture included anything to do with statements that suggested hunting was a part of that persons’ sense of self and/or culture. In addition to reasons for hunting, several conservation practitioners mentioned that as someone who works in conservation they did not hunt, they felt that hunting and working in conservation could not go together. Additional food source included those hunting for food to sustain themselves or their family, it could also include hunting for oneself and to sell. Preference includes those hunting simply because they prefer that kind of meat over other animals. Protection or human-wildlife conflict includes those responses that spoke about defending themselves or their crops/livestock from wildlife. Poverty includes those

responses that explicitly say that hunting or trade was done in response to being in poverty, this could also be included in livelihood or additional income or additional food source but it refers to the deep need of wildlife products to temporarily relieve hunger or lack of money when no other option presents itself. Hobby included those responses that spoke about hunting or fishing as a pastime activity for fun rather than substance or culture. Above the law was mentioned by one participant who spoke about people feeling a rush of adrenaline from breaking rules and not getting caught and feeling strong from hunting. Lastly, substance abuse was also mentioned by one participant who described people willing to hunt or trade wildlife illegally for cash to fuel substance abuse addictions.

Table 3: Motives for Hunting and/or Trade in Order of Times Mentioned

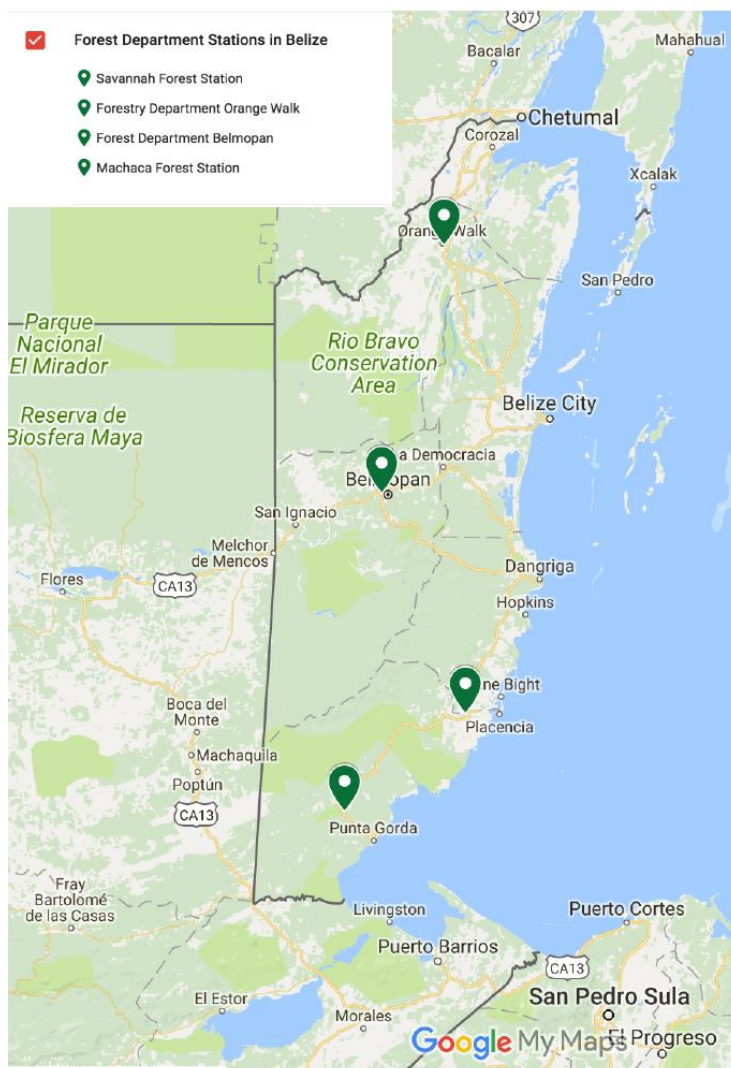
Livelihood or Additional Income
Identity and Culture
Additional Food Source
Preference
Protection or Human-Wildlife Conflict
Poverty
Hobby
Above the Law
Substance Abuse

Reduction, Enforcement, and Licensing

When asked how to reduce this activity five participants cited enforcement as the biggest thing needed to reduce this activity, three cited more farming support and two cited education; additionally, three participants mentioned that starting a gibbon ranching program could help reduce the pressure on wild populations. All participants talked about education as a requirement to reduce this activity but only two mentioned it as their number one thing to stop illegal wildlife hunting and trade in Southern Belize.

As mentioned above, enforcement was cited as the biggest factor needed to reduce illegal wildlife hunting and trade in Southern Belize. Many respondents suggested that resource

availability for both government and NGOs was low and could be a reason why enforcement was not where it could be. Seven participants spoke about issues with hunters and fishermen from neighboring countries, mainly Guatemala and Honduras, as a major issue to Belize’s resources and that more effort should be put into reducing this activity and increasing the fines for foreign hunters or fisherman hunting or fishing illegally. In addition, participants mentioned that people in their community know they will not run into Wildlife Officers or rangers while out hunting and do not feel the need to get a license. They know that the chances of someone asking them for proof of a hunting license is very low and the risk of getting caught is less than the benefit of hunting illegally.



In addition to this, licensing for both guns and wildlife hunting permits continue to be very low. In Stann Creek, there are eight applications for hunting licenses for the entire district, while there are less than five applications for a dealers license in the entire country. Nine participants spoke about the lack of incentive to get a hunting license because enforcement is so low. Participants did say that most people in their communities know about hunting licenses but do not feel the need to

get one. Concern about pricing was not mentioned frequently but when mentioned participants did say that for some people the price of a hunting license is not affordable for them. Lastly, there is one main Forest Department office per district, except for Corozal (see map above), that people must travel to apply for a hunting license.

Government and NGO Relations

A surprising trend that came up in 6 interviews regarding Forest Department Wildlife Officers and NGOs rangers was an expressed tension between the two parties. Participants spoke about the dependence of Forest Department on rangers from various NGOs and the lack of recognition they receive from the department. Many expressed frustration regarding Forest Department's lack of presence when it comes to patrolling protected areas and small amount of educational outreach they feel Forest Department is participating in. In addition, all six participants spoke about the lack of awareness from local communities about their roles as rangers from conservation NGO and what they can enforce on behalf of the Forest Department. Lastly, four of them said that the co-management system could work better if Forest Department played a larger role and had more officers to increase the presence of wildlife and resource protection in Belize. They feel that the lack of presence from Forest Department leads to a misunderstanding from communities who don't take the officers and rangers seriously.

Generational Hunting and Education

Nine participants spoke about generational hunting and differences in age groups in response to wildlife conservation. Seven of them mentioned that during educational outreach younger people are more inclined to understand and embrace wildlife conservation policies while older members of the community are more resistant. Participants who spoke about the older members said that they don't want to be told what to do or to change what they have always been doing. However, two of the participants said that they believe that the older members of the

community were more likely to hunt only what they need while the younger people will be more likely to over hunt. Lastly, of the 5 hunters only one of them was the first to hunt in their family, otherwise it was something they had learned from either the father or grandfather.

Education came up a lot in the interviews, as mentioned above all participants said that more education was needed to help reduce this activity but only two of them said it was the first thing needed. All the participants said that they felt that the increase in conservation education in recent years is a good thing and over time there will be a change as the young people in school grow up and come into the work force. They all said that focusing education and outreach on young people is the best way to have long term impacts on environmental conservation. When asked about access to information regarding language they all said that it was ok that the outreach and educational materials are in English because that is what children are learning in school and they can translate the information into other languages for their families if need be. Participants were less concerned about the materials being available in multiple languages because even if it was available in another language there was no guarantee that a person could read it. While continuing to talk about access to information seven of the participants said that there should be more information available about hunting, three of them mentioned seeing a poster somewhere but otherwise there is little information accessible to communities. Some of the conservation practitioners spoke about their individual efforts to go to the buffer communities along various reserves to talk with them and give them handouts about hunting and trade laws but without their individual efforts those communities would not get that info.

Discussion

Economic

It is difficult to quantify the economic impact of illegal wildlife and hunting on communities in Belize because the activity is obscured in the vast areas of wild jungle and small

communities. The economic impact is important to understand as it will give us the ability to quantify and compare the market in Belize to local and global trends. The costs for wildlife products can vary greatly based on location, size and state of those products. For most wildlife products the market seems quite small and localized within villages and communities throughout Belize. For example, prices for Gibnut per pound will range from \$9-10 BZD in more touristic areas such as Placencia, while in other areas the price will be range from \$5-7 BZD. It is unlikely that the people selling those products have a dealer's license because as mentioned above, there are less than five dealers license applications in the entire country. For other species such as crocodiles the market is more complex with hunters and buyers from various communities participating. Currently, the market seems small but has the potential to grow quickly as others learn about the opportunity to generate anywhere from \$200-400 BZD for crocodile tail. One of the conservation practitioners from Toledo mentioned that crocodiles are being killed out of fear and being left on the river banks, if people learn that they can make money from the carcasses then they will likely start to take those animals to sell and begin actively hunting them for that purpose. This is the beginning of a market that could become a larger issue down the road. Belize is in a unique position of identifying this issue as it is starting and could curtail this activity before it turns into a full functioning parallel economy.

Species Hunted and Sustainability

The interviews revealed that the animals being hunted illegally the most are the ones that already have seasons and are culturally popular, such as gibnut, deer and iguana. Foster et al. (2014) found that gibnut is the species that is eaten the most often by most people in Belize and is commonly consumed by pumas as well. Additionally, other studies have noted that Paca (gibnut) is the most commonly harvested wild animal in Southern Mexico and Central America Escamilla et al., 2000; Altrichter, 2001; Koster, 2008). There is no current available data for

population status of animals such as gibbon, deer and iguana and this is concerning as it is difficult to make sound wildlife management plans and estimate a maximum sustainable harvest without this information (Foster et al., 2014). However, through a production model Foster et al. (2014) found that the annual harvest of gibbon and white-tailed deer exceeded the maximum sustainable harvest of rainforest populations at carrying capacity, while that of armadillo and red-brocket deer were borderline unsustainable. This model supports the need for population assessment for culturally important, hunted species in Belize. Moreover, three participants talked about the possibility of gibbon farming in Belize as an alternative to hunting wild populations, suggesting that people are willing to change how they get this type of food.

Currently, hunting of species such as crocodile or manatee are purely opportunistic when out hunting or fishing for other things. As mentioned above, there is incentive for crocodile hunting due to the growing Chinese market in Belize and efforts must be made now to curtail this practice before it grows larger. Furthermore, both crocodile populations are currently being assessed by the Crocodile Research Coalition and those assessments should be available soon. These data will provide the necessary information to update the conservation status of both species and help build further protections as they face various threats in Belize.

As mentioned above, the classification of an animal as endangered does not stop people from hunting it. Participants mentioned that culturally important species such as the Hicatee are favored by many communities, especially in Toledo, and if people see them they will kill them for food. Hunters often go out for something specific such as gibbon or deer but will shoot most animals they come across. Participants confirmed that most hunters will not follow a quota but kill what they find and keep some for themselves while selling the rest.

In addition, transboundary illegal hunting, fishing and harvesting has been an issue in Belize for quite some time, mainly with Guatemala and Honduras. The long-standing border dispute between Belize and Guatemala has added to the current tension between the two countries regarding illegal wildlife and resource harvesting in Belizean territory (Perez et al., 2009; Groff and Axelrod, 2013). Seven participants talked about the issue of Guatemalan citizens coming into Belize to harvest forestry products such as Rosewood and xaté, and hunting wildlife while they are out harvesting those products. Salas and Meerman (2008) determined there was strong anecdotal evidence that the game species such as gibbon, peccary, deer and turkey have suffered greatly because of the hunting pressure by Guatemalan xateros (those that harvest xaté). In addition, perceptions about Guatemalans coming into Belize are negative and all participants stated that they feel it is damaging to Belize's resources and people. It is well documented that people from buffer communities on the Belize-Guatemala border are coming in frequently and although there has been increased patrols in Chiquibul National Park, there are still areas where people can get through (Perez et al., 2009; Groff and Axelrod, 2013). This relationship between Belize and Guatemala is important not only for wildlife conservation but for the identity of the respective citizens. Some Belizeans feel that Guatemalans do recognize them as their own country, while some Belizeans do believe that Belize should be part of Guatemala (Groff and Axelrod, 2013; Marty, 2014; Leslie, 2017). It is a complex conflict that has undoubtedly impacted the perceptions of the other and will continue to effect conservation efforts, directly and indirectly, for the foreseeable future and should be approached with great consideration when developing conservation initiatives along the border.

Motives for Hunting or Trade

This study found that there are multiple reasons why people hunt, it is generally not for one reason alone. Livelihood and additional income, culture and identity, and additional food

sources were the main motivations for hunting. Although participants were asked to give one reason why people participate in illegal wildlife hunting and trade they often gave several reasons, showing that motivations for this are complex and will likely change based on circumstance and preference. In Belize, consumption of wild meat is widespread and at least 75% of people surveyed in a study by Foster et al. (2014) ate wild animals regardless of their income suggesting that food choices were more culturally based rather than for economic reasons. Other studies have found this as well; in Tanzania Fischer et al., (2014) found that changing perceptions on household wealth and law enforcement had effects on hunting over time and support the notion of illegal wildlife hunting and trade as a complex, dynamic activity that changes over time. Furthermore, the continued exploration into causation and impacts of illegal wildlife hunting and trade is needed as it changes over time as it will have wide ranging impacts on economic, environmental, political and social sectors (Lindsey et al., 2013). Lastly, none of the participants knew any hunters who are currently hunting for a full-time job. All mentioned that people hunt for supplementary income or protein, and for cultural reasons rather than to support their families full time.

Many conservation practitioners said they used to hunt or still consume game meat but many felt that one could not work in conservation and be a hunter. This highlights a perception that hunting is not sustainable and is not seen as an ecologically friendly practice. This is a different perspective from other countries, such as the United States, where there are many conservation organizations that were started and are supported by hunters such as Ducks Unlimited. This is something that needs further study as only five conservation practitioners were interviewed for this study, however, it does provide an insight into the identity and perception of wildlife hunting in Belize.

Reduction, Enforcement, and Licensing

The current conservation laws in Belize support regular and effective enforcement for wildlife, however, lack of resources and personnel make it difficult to put the laws into action. Both the Wildlife Protection Act and National Protected Areas System Act outline wildlife use regulations both in and out of protected areas. However, five participants spoke about the need to update the Wildlife Protection Act to increase fines for offences and update the schedule (the list of species that are non-huntable). More importantly, they said that enforcement of those laws should be increased because even if they laws are updated they serve little purpose when people are not enforcing them. Increase in enforcement was the most mentioned when asked what was need to reduce illegal wildlife hunting and trade, all participants spoke to the lack of enforcement in their communities. People are not concerned with getting caught because it would be unlikely that they would run into anyone asking for their license or enforcing their hunt. A study in Mexico showed that illegal hunting levels vary according to hunters' perceptions about the consequences and that it is common despite a legal framework because enforcement is so low (Reyes et al. 2009). In addition, people hunting for substance likely place greater value in getting additional food rather potential punishment for getting caught (Groff and Axelrod, 2013). Three participants mentioned that starting a gibbon ranching program could help reduce the pressure on wild populations. This is a model that has proven to be successful in many countries, such as the United States, where American Alligator populations had been decimated by over-hunting but increased enforcement and introduction of captive breeding and ranching programs helped wild populations return to healthy levels (Thorbjarnarson, 1999).

In regards to, licensing there is confusion around requirements from both conservation practitioners and hunters. For example, one of the conservation practitioners stated that people could hunt in National Parks but not in reserves, however, according to the Belize National

Protected Areas System Act (2015), which outlines the laws and regulations for all protected areas in Belize, it states that:

“no animal shall be hunted, killed or taken and no plants shall be damaged, collected or destroyed in a national park or nature reserve;” (p.447)

This is concerning because if conservation practitioners are confused or misinformed about where people can and cannot hunt then that information will be passed onto the communities that they interact with, which can lead to increased misuse of various protected areas in Belize. In addition, there is some confusion about the kind of licenses available and their cost. For example, one hunter mentioned that it is cheaper to get a farmers gun license than a hunters license so many people just get the farmers license and use that to be able to hunt. However, you still have to get a hunting license in order to actively hunt, the farmers license just gives you the ability to shoot animals that come for your crops or livestock (Wildlife Protection Act, 2000). They are correct that the farmers license is cheaper than a hunting license but it cannot replace a hunting license. Lastly, hunting license applications in Stann Creek currently stand at eight, the official number for Toledo is unknown but estimated to be about five. There is a surprisingly low amount of applications for the amount of hunting occurring in these districts.

Government and NGO Relations

As mentioned above some participants mentioned issues regarding the relationship with Wildlife Officers from the Forest Department. Some have expressed that there is little recognition for the work they do on behalf of the Forest Department, and it is well known that the co-management system in Belize is one that Forest and Fisheries Departments depends on heavily because they do not have enough people to do consistent patrols. Various NGOs provide daily, on the ground patrols and enforcement in various locations of Belize, while reporting to Forest or Fisheries Department when something is found. There seems to be confusion on each

organization's role (i.e., if Wildlife Officers are supposed to be patrolling or not). This confusion and lack of recognition leads to tension within the environmental management sector and thus reduces the efficacy of enforcement and conservation. This needs more inquisition with both rangers and Wildlife Officers but it suggests that there is room for both growth and understanding about roles and recognition for work done. This relationship is vital to Belize's conservation success and should be assessed further.

Generational Hunting and Education

The difference in responses to conservation programming regarding age were mentioned by seven participants, suggesting that older members of the community were less responsive to community outreach regarding hunting regulations. Participants mentioned that some older community members have told them they have always hunted a certain way or in a specific place, thus no one could tell them where or how much to hunt. They suggested that younger people were more receptive to conservation outreach around hunting and environmental education. This is an interesting trend that is likely tied to environmental education programming and the lack of enforcement historically in Belize. It is not uncommon to find resistance to conservation programming and although there is less data on differences in age, many studies suggest that resistance to conservation programming can stem from the programming itself, political agendas, power disparities and identity if the context of the community and their needs are not fully explored (Holmes, 2007; Deruiter, 2010; von Essen et al., 2015; Peterson et al., 2016).

Education and community outreach can have significant impacts in community perceptions about wildlife and conservation (Grey-Ross et al., 2010; Liu et al. 2011; Groff and Axelrod, 2013; Mamo, 2014). All participants mentioned a need for increased education programs to help with wildlife conservation, however, they all said that currently there is little

outreach regarding illegal wildlife hunting and trade. One participant mentioned that Fisheries Department will do more outreach 2-3 weeks before lobster or conch season starts but other times of the year there is very little engagement. Four participants suggested that both Forestry and Fisheries Departments should increase community outreach for all hunting, fishing and harvesting seasons or coordinate with NGOs to do the outreach. Three participants talked about a “house-to-house” program that their organizations are working on where conservation practitioners will go to the communities in their area and personally talk to and hand out information regarding wildlife, resource and protected areas laws. One of them has given the communities he works with his personal number so they can contact him with questions. This kind of program is one that should be expanded throughout Belize for several reasons. First, it gives people exposure to rangers and wildlife officers so they can get to know them personally and build relationships. Secondly, it gives people various ways to access this information other than reading or internet access. Third, it provides consistent information and education to communities. For this kind of program development it is important to mindfully chose who the messenger will be as some communities in Guatemala have expressed distrust for Belizean authorities (Groff and Axelrod, 2013) and it is likely that other communities in Belize may not trust authorities or educators that they have no relationship with.

Conflict Analysis

Conflict analysis is a useful tool for understanding the stakeholders and their relationships within the conflict. Secondly, it gives organizations the ability to take a conflict sensitive approach to their interventions, without a conflict sensitive approach organizations may unintentionally fuel, cause or exacerbate existing conflicts. Lastly, it can visually represent where windows of opportunity may lay for starting an initiative (Hammil et al., 2009). Appendix B shows a conflict map of the stakeholders and the state of their relationships with one another,

in addition it represents the influence that each stakeholder has on the issue and thus can help determine positions of power and how that influence is impacting others in the conflict and the conflict itself. Below is a discussion on the content of some of the stakeholders and suggestions of where to start.

Forest Department is one of the main stakeholders that could have a large influence on this issue since they are the regulatory body and main source of enforcement. They have a lot of influence because they also train NGO rangers to become constable officers, which gives them the knowledge and recognition from Forest Department to enforce and collaborate with communities on resource and wildlife regulations. In connection with this, NGOs and the rangers also have a large impact on this activity as they are on the ground working on this issue daily. You will notice on the Conflict Map that their relationship has been labeled as a “broken connection” because, as discussed above there is tension between the two groups and misunderstanding of the responsibilities that each one has. These groups already have a working relationship but as the two main groups dealing with illegal wildlife hunting and trade it is important that their relationship is cohesive and they feel they can depend on each other.

Hunters and farmers are often the same as many farmers participate in hunting, and it is the most important relationship to develop moving forward as they are the ones directly hunting and trading wildlife. On the Conflict Map you will see that the hunters’ relationship with Wildlife Officers is labeled as “broken connection,” while the relationship with NGO rangers is labeled as “regular exchange/contact with direction of influence” coming from NGO rangers. The NGO rangers have stronger connections to their respective communities and have regular working relationships with hunters. They are an incredibly valuable player in this conflict and their input is vital.

The agricultural department could also have a big impact on this issue through farmer support and subsidies, as there are many people in Belize who want to farm and a good amount of land that has already been cleared. If farming is more affordable to start up and keep going then people from the smaller villages could devote more time to building a safe and dependable career. In a structural sense, the Agricultural department has made it difficult for small Belizean farmers to not only compete but stay in the market and this leads to people losing their farms or yield for the year and thus driving some people to use resources unsustainably. The market and distribution chains for agriculture are underdeveloped in Belize leaving many people with the crops rotting before they can get them to the markets. Instability and underdevelopment in food distribution throughout Belize makes it difficult for people to turn a profit from farming and must turn to other options for income. More studies need to be done on this issue specifically before making major recommendations but it is clear that many Belizeans do not feel supported to go into farming with little to no support when the crops fail. This kind of indirect, structural underdevelopment has an impact on illegal wildlife hunting and trade and should be considered when looking at windows of opportunity for building a system that supports people so they can support their families and communities, and thus avoid needing to use wildlife resources unsustainably.

These four stakeholder groups are a great place to start when thinking about programming for illegal wildlife hunting and trade. The development of these relationships and a further assessment of how the agricultural department can better support small farmers in Belize is one that should be a priority moving forward in terms of stakeholder engagement and relationship building.

Recommendations

Short term

- Update Forest Department website so it comes up when an online search for Belize hunting laws is conducted; people need to know where the FD offices are;
- Include relevant information about hunting and trade in Belize on the Forest Department website in English, Spanish, and Belizean Creole (and possibly in Mopan and Q'eqchi');
- Increase “house to house” visits from conservation rangers to talk to people about the hunting laws and give them access to information;
- Build a multi-organization task force that is dedicated to creating programs to address illegal hunting, fishing and harvesting with communities around the country.

Medium term

- Trainings and workshops with local rangers and the respective wildlife officers in the area so they can better understand each other’s roles and how to build a stronger, collaborative relationship;
- Assess viability of creating a ranching/farming system for gibnut, and possibly other hunted species;
- Need updated population studies for hunted species, namely gibnut, deer, iguana, and peccary;
- Use tools and concepts such as Conflict Sensitive Conservation in development of new conservation initiatives;
- Conduct a gender assessment of any programs that are developed as the majority of hunters are men and they will likely be the primary beneficiary of any program. As mentioned above, there are women in Belize that participate in hunting, although at low levels, and it is necessary to get their perspective.

Long term

- Continue educational outreach to students with both NGOs and government organizations on a regular basis, consistent outreach;
- Update conservation status for hunted species to reflect current population trends to make sound management and hunting regulations;
- Encourage and support NGO - Forest Department collaborations;
- Work with Agricultural Department to look at ways to better support Belizean farmers to not only start but stay in agriculture. This was brought up by six different participants and certainly needs more studies but it is clear that people are frustrated with the system and feel it is not a secure way to support oneself.

Information from this study is preliminary and more interviews and assessments are needed, however, this will contribute to the data in Belize about the nature of this activity and how it changes over time. Future studies will include following up with those participants that talked about female hunters to learn about how hunting and trade of wildlife is impacting their lives and what they need from conservation programming. I am also interested in following up

with women who do not hunt directly but are connected to it in some way, i.e. processing, cooking, selling, etc. Additionally, further studies are needed to better understand the market and motives for illegal wildlife hunting and trade.

Conclusion

This paper aimed to explore the many facets of illegal wildlife hunting and trade in Southern Belize in hopes of identifying drivers and impacts of this issue. The three main motivations for hunting illegally found during this study, livelihood/additional income, additional food source, and identity/culture, are consistent with other findings from studies around the world (Bridgewater et al. 2006; Groff and Axelrod, 2013; Lindsey et al. 2013; Duffy et al. 2016; Robinson, 2017). While the findings are not conclusive, they provide an insight into the needs of Belizean hunters and conservation practitioners that can be useful when developing programs and exploring a deeper understanding of motivations. However, all participants talked about gibbon and deer as the main hunted species, suggesting that animals that have a legal hunting season are hunted illegally more than other species that are considered non-hunttable. This finding is different from other illegal hunting studies that focus on animals that are completely off-limits for hunting. This research, along with other studies, supports the need for a holistic approach that includes educational outreach, community needs assessments, increased support for farmers and ranchers, relationship building between government organizations and NGOs, and enforcement. If we focus solely on income and economic factors then we ultimately assume that the market will save the environment and we know this to not be true. To create lasting, transformation with an issue such as this it is important that we take an approach that acknowledges the cultural and structural forces that impacts this activity in addition to economic factors. This is where Conflict Sensitive Conservation or Conservation Conflict Transformation

can create a framework to help organizations in Belize understand the multitude of factors that are contributing to this problem and ways in which they can become more conflict sensitive in their practices and program development.

As Belize's population continues to grow it is imperative that conservation and governmental organizations develop programs to address illegal wildlife harvesting in a way that recognizes the factors that impact people, both direct and indirect, in regards to social and economic mobility, identity and culture. The ways in which we explore the intersections of multi-disciplinary issues such as illegal wildlife hunting and trade are expanding. Practitioners from various fields are coming together to in recognition that our environmental problems, wherever they may be, cannot be solved by science alone. Wildlife conservation is one of these fields where practitioners and communities are recognizing that in order to save our environment and wildlife we must address the deeper needs of the humans that share those same ecosystems. Wildlife conservation in Belize is complex and ever changing, as conservationists, it is important to move with those changing dynamics to not only meet the needs of the environment but of the people that share it.

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APPENDIX**Appendix A: Interview Questions****Hunter:**

1. How long have you lived in this area?
2. How often do you go hunting/fishing?
3. When did you start hunting? Why?
4. Are you the first to hunt in your family? If not, how many years or generations has your family hunted for?
5. What techniques/tools do you use to hunt with?
6. What species do you hunt?
7. Why do you choose those species?
8. Do you eat them and/or sell them?
9. Do you know what animals are legal to hunt?
10. Do you know often do people hunt animals that are classified as non-hunting species such as crocodile, manatee, ETC?
11. How much do you get for the animals you sell?
12. Does hunting supplement your income/family life?
13. Do you considered hunting a hobby or a livelihood or both?
14. Do any women help in this process? I.E. do they go hunting? Do they sell or eat or clean whatever you have hunted?
15. Are there certain species or parts of species that are requested more than others? If yes, do you know why?
16. Do you know why there are hunting seasons?
17. Do you feel that information about hunting here is accessible?
18. Do you feel like you understand the purpose of sustainable use? Why?
19. Do you feel that the hunting in Belize is sustainable? Why or why not?
20. How has hunting changed since you first started? Less or more animals? Have animals decreased in size?
21. Do you feel that conservation organizations are helpful to your community?
22. How do you feel about the Belize Forest Department? What is there role in wildlife conservation?
23. Who regulates hunting?
24. Do you think education and outreach is helpful for something like illegal wildlife hunting and trade? Why?
25. What happens if someone is caught hunting illegally? What about trading wildlife illegally?
26. How did you learn about what the hunting and trade laws here in Belize?
27. Did the start of the Wildlife Protection Act in 1981 impact you or your family or anyone you know?
28. [if applicable] – what was hunting like before independence in 1981?
29. In recent years there has been an increase in enforcement, how has this impacted your family?
30. Does the classification of ‘endangered’ factor into your decision to hunt or not?
31. What would be needed to stop hunting the non-hunttable species or species out of season?

Conservation Practitioner:

32. How long have you lived in this area?
33. How long have you been involved in the field of conservation/wildlife?
34. Do you hunt or consume game meat?
35. If yes, what animals?
36. Did the start of the Wildlife Protection Act in 1981 impact you or your family or anyone you know?
37. Do you feel that the hunting in Belize is sustainable? Why or why not?
38. Do you feel like you understand the purpose of sustainable use? Why?
39. How has hunting changed since you first started working in conservation? Less or more animals? Have animals decreased in size?
40. Do you think the classification of “endangered” impacts people choice in what animals they hunt?
41. How do you feel about the current environmental laws, what changes would you make?
42. What are the hunted species that have the most violations?
43. What is the average number of wildlife hunting/trade violations in a month?
44. What non-huntable species do you confiscate the most?
45. How where the hunting seasons decided?
46. Do you think that information about hunting is accessible to people here?
47. What do you think is the biggest contributor/reason to illegal wildlife hunting and trade?
48. Do you think education and outreach is helpful for something like wildlife hunting and trade? Why?
49. What happens if someone is caught hunting illegally? What about trading wildlife illegally?
50. How did you learn about what the hunting and trade laws here in Belize?
51. What do you think is needed to stop hunting/buying/selling the non-huntable species or species out of season?

Do you feel well-versed in knowing the roles of predators in Belize? Do you feel that you can pass along such information to your community?

Appendix B: Consent to Participate

Title: Wildlife Hunting and Trade in Southern Belize: An Assessment of Impacts and Drivers

Researcher Contact Information:

- Blakely Rice, Principal Investigator
- **Email:** blakely.rice@mail.sit.edu
- **Belize number:** (501)660-4655

Purpose of the Study:

The purpose of this study is to explore the various experiences and stories associated with wildlife hunting and trade in Southern Belize. It is to gather information about why people participate in this activity and how they go about doing so. This study also aims to compile some baseline information about the market for hunting and trade to better understand the activity, the drivers that keep it going and how conservation organizations interact with it.

Procedure for selection and interview:

You have been chosen to participate in an interview about wildlife hunting and trade in Southern Belize. If you agree I will ask you to do the following:

- 1) Participate in one interview for about one hour between May and June 2017 to be scheduled at your convenience;
- 2) The interview will be semi-structured in format, where we will have a conversation about your opinions and experiences with wildlife hunting and trade;
- 3) Your interview will be audio recorded, either through the researcher's phone or computer; you may opt out of this if you like. However, this procedure is incredibly helpful in the analysis phase of the study and is graciously recommended by the research team;
- 4) You will be asked if you know anyone else I could interview for this study, if you recommend someone I will have you sign a non-disclosure form. This is to keep the recommendations anonymous and protect all participants;
- 5) You will be provided with a summary of the findings. You may ask to see a draft before publication, Blakely Rice will contact you several weeks before the publication date.

Confidentiality:

All information provided will be strictly confidential. No identifiable information will be included in the data analysis or report; copies of the data will be stored with me and the Crocodile Research Coalition. The raw data will be only be viewed by me. The coded and protected transcriptions will be seen by my advisor Dr. Bruce Dayton and the Crocodile Research Coalition team (Dr. Marisa Tellez and Karl Kohlman). The audio recordings will be destroyed after they have been transcribed and coded. The results of this study will be published in the form of a capstone paper and permanently stored in the digital archives at SIT Graduate Institute. You will have the opportunity to ask, and have answered, all your questions about this

research during and after the interviews by emailing or calling Blakely Rice, please see my contact information at the top of this letter. All inquiries are confidential.

Potential risks, potential benefits

The risks of this study are very low, I will be asking about your experience with hunting and trade in Belize, you are not required to answer any question I ask and may pass or end the interview at anytime. If distress or discomfort comes up for you during this process, you may pause or discontinue the interview. Potential benefits are sharing your personal story and experience to help create understanding about wildlife hunting and trade in Belize, a subject with limited information. It will also greatly contribute to the current local, national and international framework on the connection between wildlife conservation and poverty.

Note About Voluntary Nature of Participation and Statement About Compensation:

While I cannot compensate you for your time, your participation is voluntary and will be invaluable to this project as I seek to understanding of how wildlife hunting and trade is understood and how it impacts different kinds of people.

Participant’s Agreement Statement:

If you agree to participate in this study, I would appreciate you signing this form before I begin the interview. You can give me a fake name or no name at all if you prefer, due to this option please sign your conformation below as “participant #.” I am the only one who will know that you are participant #.

Rights of Research Participants

The SIT Review Board has reviewed my request for this project. If you have questions about your rights as a research participant, or are dissatisfied at any time with any aspect of this study, you may contact SIT at 1 Kipling Road, Brattleboro, VT 05302, University Institutional Board/IRB or at irb@sit.edu.

I have read the information provided above, and I voluntarily agree to participate in this study. After it is signed, I confirm to have the results from my interview to be used by Blakely Rice for her research. I have been offered a copy of this form.

.....
Signed Conformation

.....
Date

Thank you.

Sincerely,

.....
Blakely Rice

.....
Date

Appendix C: Conflict Map for Illegal Wildlife Hunting and Trade in Belize

