International Development, Community and
Environment (IDCE)

5-2017

Barriers to Sustainable Hunting-Based Conservation of Elephants in Zimbabwe

Jessica H. Cusworth
Clark University, jcusworth@clarku.edu

**Barriers to Sustainable Hunting-Based Conservation
of Elephants in Zimbabwe**

Jessica Cusworth

May 2017

A Master's Paper

**Submitted to the faculty of Clark University, Worcester, Massachusetts, in
partial fulfillment of the requirements for the degree of Master of Science in
the department of International Development, Community & Environment**

And accepted on the recommendation of

Gregory Trencher, Chief Instructor

ABSTRACT

Barriers to Sustainable Hunting-Based Conservation of

Elephants in Zimbabwe

Jessica Cusworth

The international demand for ivory has devastated African elephant populations. In 2015, more elephants were poached for ivory than were born. Many countries have sought to decrease poaching pressures through ivory trade bans. However, Zimbabwe, home to the second largest African elephant population, funds its anti-poaching efforts with revenue from ivory exports. The ivory bans implemented by other countries prevent Zimbabwe from generating many sources of ivory revenue. These bans hamper Zimbabwe's ability to fund anti-poaching efforts, and exacerbate the complex interactions between the social, economic, and political factors which contribute to poaching. Increasing the understanding of the relationships between poaching factors and poaching policy responses is therefore vital. The DPSIR (Drivers, Pressures, State, Impacts, and Responses) framework is utilized to understand how the interactions between poaching factors and policy responses create feedback loops that may increase poaching. This analysis identifies the key areas for policy intervention: economic stagnation, human wildlife conflicts, and political corruption. Coping strategies are recommended for each area to potentially decrease elephant poaching pressures in Zimbabwe.

Gregory Trencher, Ph.D.

Chief Instructor

ACADEMIC HISTORY

Name: Jessica Cusworth   Date: May 2017

Baccalaureate Degree: B.A., Global Environmental Studies

Source: Clark University   Date: May 2016

ACKNOWLEDGEMENTS

I wish to express my sincere gratitude to my reader, Professor Gregory Trencher, for his guidance and encouragement during this research. His insightful critiques were invaluable, and I so appreciate his enthusiastic willingness to support this work while abroad.

I must also give a whole-hearted thank you to my parents. Words cannot express how much I appreciate their endless love and support.

TABLE OF CONTENTS

1. Introduction

Anthropogenic climate change, land-use change, and resource exploitation have caused devastating declines in global biodiversity (Williams et al. 2015; Boivin et al. 2016). Humans have driven Earth towards its sixth mass-extinction event, in which species are facing extinction rates that are 1000 times historical rates (Ceballos et al. 2015; Mantyka-Pringle et al. 2015). When combined with environmental changes, the exploitation and trade of certain species has brought many close to extinction (Nellemann et al. 2014). The black market demand for ivory has fueled a devastating trend of African elephant poaching, where more elephants are being killed than are being born (Carrington 2016). Nearly 40,000 African elephants were poached in 2012 to satiate global demand for ivory, and their population has decreased by nearly 30% in just the past seven years (Wittemyer et al. 2014; Chase et al. 2016). Though the Convention on International Trade of Endangered Species of Wild Fauna and Flora (CITES) imposed a ban on international ivory trading in 1989, the weight of globally traded ivory is currently three times greater than it was in 1998 (Bennett 2014).

CITES has been the primary mechanism for addressing international natural resource trade exploitation since its ratification in 1975. It is a voluntary international agreement that is widely recognized as one of the most successful and important international environmental treaties in the world.

This appraisal is based on a large number of member states (183), which are referred to as Parties. This is also based on its successes in granting protection to 35,000 plant and animal species (Doukakis 2012; Dickson 2002; Fuchs 2010). Every three years, CITES Parties are required to attend a Conference of the Parties (CoP) to create or amend national-level trade regulations on wildlife. CITES does not have the power to implement these regulations, however, the Convention itself is legally binding on the Parties. This means that if a Party wishes to remain a CITES member, they must implement the Convention (CITES 2016). It is therefore up to each Party to implement CITES regulations by creating and enforcing their own domestic laws. The success of CITES regulations are therefore dependent on each member state's execution and enforcement of the bans on their own terms (Padgett 1995).

At the most recent CoP in 2016, all Parties were urged to completely shut down any remaining domestic legal markets to reduce elephant poaching pressures (USFWS 2016). Complete market closure is thought to prevent criminals from sneaking illegal ivory into legal domestic stocks, particularly in Asian markets (Hsiang & Sekar 2016). The United States and China, both top ivory consuming countries, have now put forward legislation for complete closure of their domestic ivory markets (Neslan 2016). Zimbabwe, a CITES member since 1981, has continuously fought these international and domestic ivory trade bans, and fervently argued for reopening legal

international markets at CoP 2016 (CITES 2016).

Zimbabwe's frustrations about the impacts of these bans are warranted because they directly interfere with their own elephant management practices. Zimbabwe is a major actor in the international ivory trade as it is a key elephant range state. It hosts the world's second largest elephant population, with nearly 83,000 individuals left, second only to Botswana (Zimbabwe Park & Wildlife Management Authority 2016). Populations in this region are greatly threatened by poachers, who are responsible for nearly 60% of total African elephant deaths (Carrington 2016). Zimbabwe relies on hunting-based conservation, defined as trophy hunting and regulated ivory sales, to generate funds for anti-poaching efforts as well as community development projects (CITES 2016). This income incentivizes elephant conservation for locals who may otherwise view elephants as pests and be tempted to poach them (Alexander & McGregor 2000; Frost & Bond 2007).

As ivory restrictions tighten, Zimbabwe may have trouble sustainably continuing these conservation methods. Without legal domestic ivory markets in the U.S and China, Zimbabwe's communities may face challenges generating sufficient funds for conservation and community development from the legal sale of ivory. This may ultimately reduce funds for anti-poaching efforts, while the absence of legal profit may drive communities to poach elephants to sell their ivory on the black market

(Zimbabwe Parks and Wildlife Management Authority 2015; Lemieux &

Clarke 2009).

The topic of evaluating the sustainable use of elephants has been explored

quite extensively, though the literature depends on data from the 1990's

through the early 2000's to shape arguments (Abensperg-Traun 2009; Frost

& Bond 2007; Hutton & Leader-Williams 2003; Hitch 1998). This spans the

time when many global domestic ivory markets were still flourishing and

capable of sufficiently funding conservation and anti-poaching efforts. As

such, this literature does not account for new ivory restrictions from the last

decade. This suggests a gap in understanding regarding the evaluation of

the logistical problems of hunting-based conservation of elephants with

these new restrictions. There is also ample literature offering research

regarding the effects of ivory bans on poaching. This research argues that a

specific poaching factor, such as government corruption (Bennett 2014;

Nellemann 2013; Varun, Ewing, & Miller 2014), civil conflict (Lemieux &

Clarke 2009; Schneider 2008), or international ivory demand (Stiles 2004),

determines the efficacy of ivory restrictions in a given country. In essence,

this research presents the connection between an individual poaching factor

and ivory bans as a linear cause and effect relationship. It fails to take into

account situations where multiple poaching drivers create feedback loops

with poaching policy responses. For example, a CITES decision allowing

Zimbabwe's one-off legal ivory sale to China and Japan in 2008 was

intended to reduce poaching. However, this ban lead to increased poaching in the following years (Hsiang & Sekar 2016). This feedback loop was fueled by the drivers of an expanding Asian economy, a stagnant Zimbabwean economy, and rife political corruption to facilitate illegal trading after the 2008 trade. There is therefore an urgent need to increase understanding into the relationships between multiple poaching factors and poaching policy responses.

This paper intends to fill these gaps by considering the multiple causes and effects of poaching as a feedback loop, also accounting for new domestic ivory restrictions from CITES Parties. It does not intend to argue for or against specific conservation methods or ivory bans. Instead, this study examines how the increasing domestic and international restrictions on ivory trading may present barriers to sustainable hunting-based conservation of elephants in Zimbabwe. The following research questions are answered to achieve this:

1. What interactions between multiple socio-economic factors contribute to poaching in Zimbabwe?
2. How have the policy responses to poaching affected these factors and interactions?
3. Which aspects of this system serve as barriers to sustainable hunting based conservation of elephants?

From a methodological perspective, this paper employs the DPSIR (Drivers, Pressures, State, Impacts, Responses) framework to address the first two questions. This is used to understand the relationships between the various drivers and pressures that are affecting the state of elephant poaching and outcomes of conservation and anti-poaching measures. The third question will be addressed by reflecting on the findings of this framework application to highlight the barriers to hunting-based conservation. Using the DPSIR framework to answer these questions enables an understanding regarding the multiple and interacting factors that influence elephant poaching in Zimbabwe. This knowledge may be valuable for identifying Zimbabwe's key areas for potential policy intervention to combat poaching in light of new ivory restrictions.

This paper is structured as follows. The background provides an overview of CITES structure and CITES actions taken on elephants, covering the period reaching up to the most recent CoP in 2016. The background also discusses Zimbabwe's history of elephant trophy hunting to provide context for the DPSIR analysis. Section 3 outlines the methods and DPSIR framework used to analyze the system of poaching in Zimbabwe. Findings are presented in Section 4. Here, the DPSIR framework is applied to first understand connections between poaching factors independently from policy responses. Next, the policy responses are factored into the framework to map out the cascading effects these policies have had on Zimbabwe's poaching factors. These results are then used to establish the socio-economic barriers to Zimbabwe's hunting-based

conservation in light of the existing domestic and international efforts to ban all ivory trading. By establishing these barriers, the many points of policy intervention for resolving conservation conflicts are identified. The results and policy interventions are discussed in Section 5, followed by concluding remarks in Section 6.

2. Background

2.1 CITES

CITES Structure

CITES classifies species into a three-tiered system of appendices in accordance with the extent of their extinction risk (CITES 1973). Species at risk of extinction are classified in Appendix I, which restricts all commercial trade of the species and its products between Parties. Species listed under Appendix II are at risk of facing the threat of extinction unless trade is restricted, and require a permit for international trading for commercial purposes. Appendix III species have legal protection in at least one CITES member state and international help has been requested to control the trade of the species.

There are two CITES structural components that may complicate the intended protection of the African elephant through trade regulations. The first component is the Parties' ability to take a "reservation," which enables them to remain unaffected by a change of the listing of a species (Reeve 2002). This means that

the country can still participate in the international trading of a species with other non-member states or with other Parties with the same reservation. A country may choose to take a reservation if they feel they have a strong economic interest in the listed species, as Zimbabwe, Namibia, and many other African countries did upon the initial Annex I listing of the African elephant. This CITES exemption was implemented to demonstrate a sense of flexibility and compromise in order to encourage non-member states to join CITES (Reeve 2002). However, this may be considered a significant weakness within CITES, as it allows Parties to participate only as long as the mandates are useful for their own needs.

The second component that may hinder successful protection through trade regulations is that hunting trophies are typically exempt from CITES mandates. This means that trophy ivory can be imported, exported, and re-exported across national boundaries, as long as there is clear CITES documentation. This exception is problematic for elephant conservation as it has created routes for illegally obtained poached ivory to slip into the trade of legally obtained trophy ivory from legal hunting (Hsiang & Sekar 2016). This exception also requires trust in often-corrupt countries to abide by their annual trophy export quotas, and trust that these quotas are based on sound science. If either of these requirements are not fulfilled, supposedly "sustainable" legal trophy hunting may actually cause unsustainable population declines, as is the case in Zimbabwe (USFWS 2015).

CITES African Elephant Listing

The African Elephant was initially classified under Appendix II in 1977, allowing

for continued international trade for commercial purposes. During the following

decade, spanning 1977-1989, the African elephant population dropped by nearly

50% (USFWS). When this legal international commercial ivory trade was first

questioned by CITES Parties in the 1980's, many Southern African countries

argued that the legal ivory market functioned as a means of conservation for their

countries. They claimed that their countries all had a great economic stake in

maintaining healthy African elephant populations for the purpose of harvesting

ivory for commercial trade (Padgett 1995). However, the catastrophic decline of

African elephant populations did not support these claims (Bennett 2014).

As a result of these declining elephant populations, the species was placed

under Appendix I of CITES in 1989. This gave the elephants the highest level of

protection and banned commercial trade of the species, effectively banning the

international trade of ivory. However, the elephant populations in Botswana,

Namibia, South Africa and Zimbabwe were able to take a reservation on this

listing and return to Appendix II, though with a special "annotation" that prohibited

commercial ivory sales, except for two occasions (CITES Secretariat 2016). This

allowed these countries to trade their government stocks of ivory from elephants

that died of "natural deaths" to China and Japan on two occasions in 1999 and

2008 (Nellemann et al 2013). It should be noted that the Parties agreed upon this

trade unanimously, as the funds raised were to go directly to conservation efforts

(CITES 2008).

The question of whether to ease or tighten control over the ivory trade was at the
center of the CITES Johannesburg meeting in 2016 (CITES 2016). The Parties
opposed Zimbabwe's proposal to reopen international ivory trading, and rejected
a decision-making mechanism that would allow for new proposals to reopen
international ivory trade in the future. However, the Parties also voted against an
African coalition's proposal to move all African elephants to an Annex 1 listing,
citing fear of backlash from affected countries (CITES 2016). This would have
retracted Zimbabwe's reservation that has allowed them to remain capable of
selling government ivory stockpiles on certain occasions (CITES 2016).
Ultimately, all Parties were strongly encouraged to close their own domestic ivory
markets to cut off the demand side of black market ivory (USFWS 2016).

2.2 Zimbabwe's Sustainable Elephant Use

```
                    ┌──────────────────────────┐
                    │  Trophy hunting & legal  │
                    │      ivory sales         │
                    └──────────────────────────┘
```

Flowchart:
- **Trophy hunting & legal ivory sales** branches to:
  - **$ directly paid to locals near hunting areas**
  - **$ for community development**
  - **$ for national park monitoring**
- **$ directly paid to locals near hunting areas** and **$ for community development** → **Incentivizes locals not to poach**
- **Incentivizes locals not to poach** → **Decreased poaching**
- **$ for national park monitoring** → **Decreased poaching**
- **Decreased poaching** → **"Sustainable" elephant management**

CAMPFIRE Program

Fig. 1: Zimbabwe's Hunting-Based Elephant Conservation. Author: Jessica Cusworth, based on information from the CAMPFIRE Association.

Zimbabwe's plan for sustainable hunting-based conservation of elephants, shown in Figure 1, is best demonstrated through its CAMPFIRE program, which

began in 1989 (Degeorges & Reilly 2009). This program was the first of its kind to stress the importance of enabling communities living with wildlife to receive direct benefits from it, known as "appropriate authority" (Alexander & McGregor 2000). The ultimate goal of the program was to show communities how effective environmental stewardship produces long-term financial benefits (CAMPFIRE Association). CAMPFIRE intends to incentivize wildlife conservation by providing producer communities with "fair" compensation for use of their wildlife resources through contracts with private tourism and safari operators (CAMPFIRE Association). This program also intends to fund training and financial support for law enforcement officers to ensure that the rules for natural resource protection are obeyed, including anti-poaching monitoring (CAMPFIRE Association).

There is conflicting research as to whether or not households actually accrued significant income from the program (Hitch 1998; Degeorges & Reilly 2009). There have often been issues from underpayments or delayed payments to households (Degeorges & Reilly 2009). However, Frost and Bond (2007) have concluded that the program's revenue was a significant source of funds for the region during the political instability of the early 1990's. Between 1989 and 1993, 24% of local revenue was income from wildlife, which exceeded other sources in all districts, including government grants (Frost & Bond 2007).

Sport hunting licenses historically generated the majority of revenue for the program, which has become an increasingly more controversial issue for the

international community over the last two decades (Hitch 1998; Corn & Fletcher 1997). The program generated $20 million in revenue to the communities between 1989-2001, 89% of which came from sport hunting (Frost & Bond 2007). More recent CAMPFIRE revenue data is scant, however CAMPFIRE submitted an undated report to the U.S Fish & Wildlife Service showing that the program generated $2.5 million in hunting revenues in 2012 (USFWS 2015). It is expected that the international actions taken against the import of elephant trophies, such as the closure of domestic ivory markets in the U.S and China, may significantly contribute towards a decline in CAMPFIRE revenue in the coming years (USFWS 2015).

Although the international community has taken steps to further restrict ivory trading, Zimbabwe "confirms its commitment to the sustainable use of elephants and other wildlife" in its 2015-2020 Elephant Action Plan (p.12, Zimbabwe Parks and Wildlife Management Authority 2015). Zimbabwe maintains that regulated trophy hunting, and the ability to import trophies back to the tourists' countries, is absolutely essential for the survival of the species. They assert that hunting-based conservation provides incentives to locals and generates funds for monitoring protected areas. Their management plan claims that 75% revenue from elephant hunting goes towards elephant conservation (Zimbabwe Parks and Wildlife Management Authority 2015). It is important to note that the Zimbabwean government does not allocate funds to the primary wildlife enforcement agency, the Zimbabwe Parks and Wildlife Management Authority (ZPWMA) (Zimbabwe

Parks and Wildlife Management Authority 2016; USFWS 2015). Therefore, the

ZPWMA must generate their own funding through donations and revenue from

commercial services on their properties, such as lodging in national parks (Suich,

Child, & Spenceley 2009).

Through this approach, Zimbabwe intends to fund more men on the ground to

combat poaching, improve monitoring and research, and incentivize maintaining

or increasing elephant range. They claim that this will require at least $12 million

per year to protect the nearly 60,000 km2 of elephant range in the country, which

they assert must come from the help of the international community (Zimbabwe

Parks and Wildlife Management Authority 2015). However, it should be noted

that after requesting documentation from the Zimbabwean government and

ZPWMA concerning their wildlife management, the United States Fish & Wildlife

Services was unable to find sufficient scientifically supported evidence that

Zimbabwe's elephant population estimates in the plan were accurate enough for

Zimbabwe to craft any management decisions (USFWS 2015). Such

management decisions include setting hunting quotas and estimating the cost of

anti-poaching efforts.

3.0 Methods

3.1 Data Collection and Analysis

The research for the literature review in this paper was performed between

September 2016 and February 2017. The JSTOR, ProQuest, GALE,

SpringerLink, ScienceDirect, PeerJ, and PubMed Central databases were utilized

to search for articles with the keywords: elephant; poaching; Zimbabwe; ivory;

Africa; sustainable; hunting; conflict. Guided by the DPSIR framework, this

provided the necessary information about individual poaching factors, which

contributed to the analysis of the interactions between each factor. The official

CITES, U.S Fish & Wildlife Services, and ZPWMA websites were used to find

official documents regarding elephant and ivory policies and proposals. This

information was used to understand how the policy responses to poaching

affected the socio-economic poaching factors.
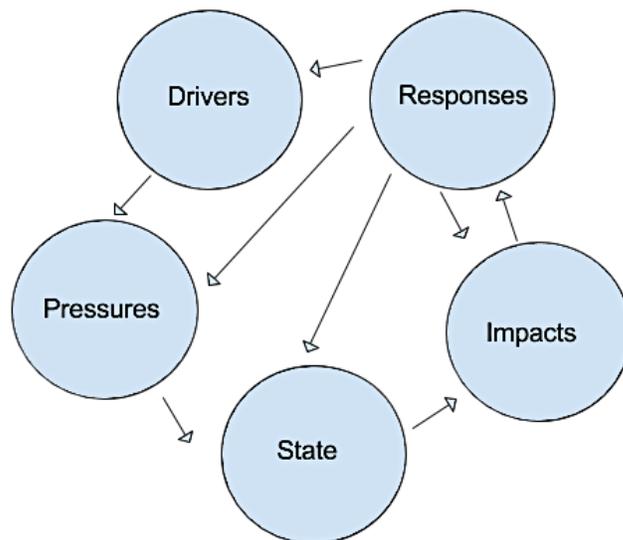
3.2 Analytical Framework

Fig. 2: The DPSIR Framework. Source: Peter Kristensen: "The DPSIR Framework," 2004.

This paper utilizes the DPSIR (Drivers, Pressures, State, Impacts, and Responses) framework, shown in Figure 2. This framework facilitates an understanding of the feedback loops of interactions between socio-economic factors of poaching and policy responses to increased poaching in Zimbabwe. The DPSIR Framework is frequently used by the European Environmental Agency to examine the relationship between political choices and ecological impacts by analyzing the driving forces, pressures, states, impacts, and responses in particular setting (Kristensen 2004). The driving forces categorize the social, economic and political factors that are the foundation of an environmental problem. The pressures demonstrate the impacts that these driving forces have on a natural resource. The state describes the environmental change taking place as a result of the drivers and pressures, while the impacts describe the environmental effects of these drivers, pressures, and state changes. The responses are the policies enacted in order to address any portion of the chain between drivers and impacts (Kristensen 2004). In this paper, the DPSIR framework allows for the consideration of the causes and effects of poaching as a feedback loop, while accounting for new domestic ivory restrictions from CITES.

Firstly, the DPSI portion of the framework is used to understand the interactions between the social, economic, and political factors which contribute to poaching in Zimbabwe. These interactions are discussed independently from policy responses, hence only examining interactions between drivers, pressures, state,

and impacts. Next, the full DPSIR framework is employed to infer how specific

CITES policy responses and domestic policy responses affected each part of the

Drivers, Pressures, State, and Impacts of poaching. Lastly, the results from these

first two questions are used to outline the aspects of this system that serve as

barriers to sustainable hunting-based conservation of elephants. These results

lay out a "map" of the aspects of the entire poaching system to show what can be

addressed through the reform of existing or creation of new policies to keep

Zimbabwe's elephant populations healthy.

3.3 Case Study Selection

Zimbabwe represents an ideal case to apply this DPSIR framework for elephant

poaching. Zimbabwe hosts the world's second largest elephant population, with

nearly 83,000 individuals left (Zimbabwe Parks and Wildlife Management

Authority 2016). As such, Zimbabwe plays an important role in global elephant

conservation efforts (Zimbabwe Park & Wildlife Management Authority 2016).

Elephant populations will continue to decline at unsustainable rates without

attempts from their habitat range countries, like Zimbabwe, to address poaching

in the very near future. Zimbabwe also demonstrates how political, social, and

economic factors contribute to elephant poaching when these factors are

considered both independently from each other and together. International policy

responses to poaching have then further exacerbated many of these factors,

which provides the opportunity to discuss the feedback loops caused by

interactions between poaching factors and responses.

4.0 Findings

4.1 Socio-economic factors and interactions contributing to elephant poaching in Zimbabwe

This section addresses the first question: what interactions between multiple socio-economic factors contribute to poaching in Zimbabwe? In order to answer this, the interactions between drivers, pressures, state, and impacts are examined, independent of policy responses. This is shown in Figure 3.
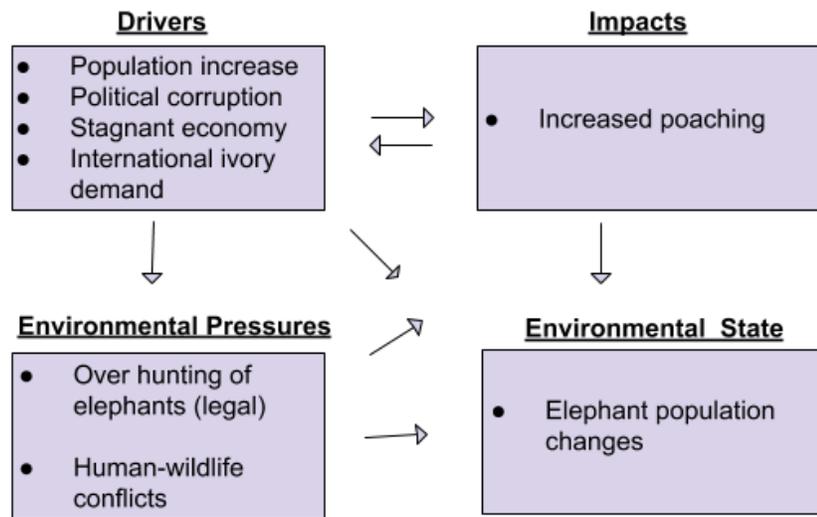

Fig. 3: Interactions between Drivers, Pressures, State, and Impacts.

4.1.2 Drivers

Population Increase

As of 2016, Zimbabwe had a population of approximately 14.5 million people with an annual growth rate of 2.2% (CIA 2016). As the human population grows, the proportion of land used for agriculture outside of protected wildlife areas

increases (Gandiwa et al. 2013). This may lead to increased instances of human-wildlife conflicts in areas where humans live close to protected areas (Gandiwa et al. 2013). Human conflicts with elephants arise because elephants frequently destroy crops and farmland (Madhusudan & Sankaran 2010). The affected humans may poach these elephants out of anger over crop losses, or to preemptively protect crops (Mariki et al. 2015). Therefore, human population increases contribute to the poaching pressure from human-wildlife conflicts.

Political Corruption

Transparency International's 2015 survey concluded that Zimbabwe ranked 150 out of 168 countries on the global corruption index (Transparency International 2016). This poor ranking can be traced back to Robert Mugabe, the nation's first and only prime minister. He has remained in power since the country's first election in 1979, and rigged the election in 2002 to secure his position (CIA 2016). During his reign, Mugabe has allowed Zimbabwe to lose billions of dollars from fraud and natural resource smuggling (New Zimbabwe 2016).

There are three notable examples of fraudulent wildlife management that are important for understanding the role that political corruption has in the elephant poaching system. The first example demonstrates the impact of corruption on conservation funding. In the 1980's, the Zimbabwean government had assured CITES that the then legal international ivory trade would fund conservation efforts. It was later discovered that the ivory revenues were instead returned to

the central treasury (Austin 1992). Resources for anti-poaching monitoring in national parks were depleted without these conservation funds, and poaching during this time was rampant (Austin 1992). This presents the first link between political corruption and poaching.

The second example demonstrates a direct link between political corruption, over hunting, and elephant poaching. Some of the largest game reserves are owned by the most avid supporters of President Robert Mugabe (Newsweek Staff 2006). Many of these reserve owners have no training or experience with wildlife conservation, and have been known to ignore the legal hunting quotas set by the ZPWMA. Ignoring these quotas contributes to the legal over hunting pressure. These reserve owners are also known for allowing poaching inside of the protected Hwange National Park (Newsweek Staff 2006).

Lastly, political corruption is reflected in today's black market ivory trade, which is frequently facilitated by corrupt Zimbabwean officials, wildlife guards, and border guards (Bennett 2014). This can be attributed to the many impoverished citizens and poorly paid wildlife officials within the country who become targets for corrupt government officials and organized criminals (Nellemann 2013). This demonstrates the link between political corruption, stagnant economy, and poaching.

Stagnant Economy

Zimbabwe ranked last out of all countries for unemployment rate, with the 2009 estimate indicating that 95% of the country is unemployed (CIA 2016). Though, it should be noted that an estimated 90% of Zimbabweans are employed in the "informal economy," which is neither taxed nor regulated by a government (Moyo & Onishi 2016). Consequently, 72.3% of Zimbabwe's population is living below the national poverty line, and 21.4% live on less than $1.90 a day (World Bank 2015).

Tying political corruption and stagnant economy together, Mugabe is responsible for the catastrophic state of Zimbabwe's economy. After his controversial land reform program in 1997, in which land from 4,000 white farmers was seized and redistributed to black farmers as compensation for colonial rule, the country faced an economic disaster (Sieff 2015). As a result of this policy, the new black farmers who received this land were inexperienced and were not given the training and equipment to properly manage these new, large, farms (Wadhams 2007). As the economy crumbled without the success of their major economic staple, the agricultural industry, unemployment and poverty skyrocketed, and inflation reached a high of 5,000% (Wadhams 2007). Zimbabwe struggled to provide food and basic commodities to its citizens for years after this land reform (CIA 2016).

Zimbabweans still have yet to recover from this economic collapse. Poaching has

become a means of survival for many Zimbabweans due to the poor state of the

economy and ongoing political corruption. Many of the subsistence farmers who

moved in after the catastrophic land reform program were unable to make a living

off of the land, and eventually turned to hunting the wildlife that had historically

been protected on the old private ranches (Wadhams 2007). Without a booming

agricultural or mineral industry to formally employ citizens, those who remain in

Zimbabwe are given few other opportunities to make a living, making poaching a

very tempting option. Therefore, this interaction between political corruption and

a stagnant economy significantly contributes to poaching.

International Ivory Demand

Zimbabweans' appetite for ivory money has largely been satiated by Asian

demand. In 2013, a Chinese wildlife trade official claimed that the Asian demand

for ivory required about 220 tons of raw ivory each year, which would require the

deaths of nearly 20,000 elephants annually (Levin 2013). With China's middle

class rapidly expanding, there is an increased number of potential ivory buyers to

feed the demand for black market ivory. As of 2010, 11.2 % of China's population

was living on $1.90 a day, but this number jumped down to an astonishing 1.9%

in 2013 (World Bank 2015). This presents a poaching feedback loop driven by

ivory demand. China's ivory demand drives poaching, which decreases elephant

populations (Levin 2013). This makes ivory more scarce on the markets, which

increases its market value (Carrington 2016). With many more potential Chinese

consumers, the demand for ivory continues to drive an increase in poaching

(Carrington 2016).

Political corruption also interacts with this international ivory demand and increases poaching. The illegal ivory exchange between African countries and China is rampant. As China has continued to strengthen its trade ties with Africa since 2009, the opportunities to smuggle ivory through shipments of plastic waste and grains have greatly expanded (Swanson 2014). There are also millions of Chinese nationals living throughout African ivory supplier states who smuggle ivory in their suitcases, which accounts for nearly 90% of ivory seizures in China (Swanson 2014). A healthy supply of corrupt Chinese officials, complimented by corrupt Zimbabwean border guards, are also willing to perform or facilitate the cross-continental transport through diplomatic channels (Swanson 2014; Bennett 2014). The corruption of these Zimbabwean guards therefore enables the satiation of the international demand for ivory (Bennett 2014). This presents an interaction between political corruption and international ivory demand, which increases poaching.

4.1.3 Pressures

Over Hunting (legal)

Zimbabwe's established annual quota of 500 trophy hunted elephants per year is not based on accurate population estimates, making their legal hunting quotas potentially unsustainable. These quotas are particularly unsustainable when poaching losses are accounted for (USFWS 2015; CITES 2016). Zimbabwe is

notorious for inflating their population estimates, as they have historically not allowed independent scientific review of their elephant census data and have counted non-resident migrating elephants as residents (Austin 1992). This exploitation through legal hunting is a result of an interaction between political corruption and a stagnant economy, as these factors hinder funding for sound scientific research (USFWS 2015).

Impacts

Poaching has already been discussed as an impact of the stagnant economy. However, poaching also exacerbates this economic state by creating a feedback loop and contributing to further economic losses. It has been estimated that elephant poaching results in a loss of $25 million in economic benefits that would have been accrued through tourism in southern Africa's protected areas (Naidoo et al. 2016). Therefore, the stagnant economy, which drives poaching, is further impaired by this increased poaching.

4.2 Impact of International Poaching Policy Responses on Poaching Factors

This section integrates policy responses into the poaching factors and interactions from the previous section by utilizing the full DPSIR framework. It addresses the second research question: how have the policy responses to poaching affected these factors and interactions? This section will look at how specific CITES policy responses and domestic policy responses affect the

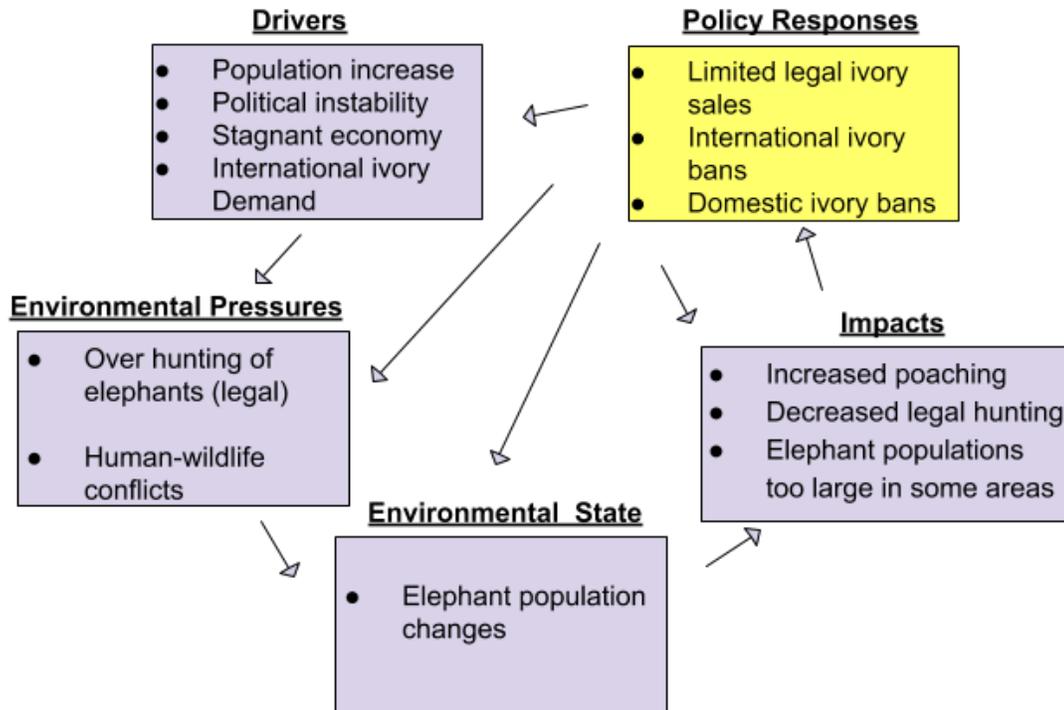Drivers, Pressures, State, and Impacts of poaching, as shown in Figure 4.

Drivers
- Population increase
- Political instability
- Stagnant economy
- International ivory Demand

Policy Responses
- Limited legal ivory sales
- International ivory bans
- Domestic ivory bans

Environmental Pressures
- Over hunting of elephants (legal)
- Human-wildlife conflicts

Impacts
- Increased poaching
- Decreased legal hunting
- Elephant populations too large in some areas

Environmental State
- Elephant population changes

Fig. 4: Interactions Between Drivers, Pressures, State, Impacts, and Policy Responses

4.2.1 Impact of Policy Responses on Drivers

International Ivory Demand

The CITES policy to allow for legal limited ivory sales in 1999 and 2008 from Zimbabwe to Japan and China was a response intended to decrease international ivory demand. In 2008, the two countries purchased 107 tons of ivory for $15 million in an effort to flood the Asian markets, which would drive down the cost of ivory (Carrington 2016). This would theoretically make poaching

a less profitable endeavor, while also bolstering anti-poaching efforts in Zimbabwe by putting the ivory profits towards conservation efforts (Carrington 2016).

The 2008 legal sale preempted "an abrupt significant, permanent, robust and geographically widespread increase" in elephant poaching (Hsiang & Sekar 2016). In their study, Hsiang and Sekar (2016) hypothesize that by permitting this massive legal sale, the existing stigma against ivory was negated, which ultimately boosted the demand for ivory. It has also been suggested that this legal trade enabled a cover for smuggling illegal ivory, so despite the decreased price of ivory that this market flooding provided, the demand for ivory and consequential poaching both increased as a result of this poaching policy response (Carrington 2016).

However, there are now new domestic policy responses from both the U.S and China that aim to decrease demand for ivory by committing to complete closure of domestic ivory markets. As of December 2016, China is planning to phase out their own domestic ivory trade by 2021, which will ban trade of elephant hunting trophies, ivory carvings, and will ban all sales on ivory acquired before 1990 (Kao 2016). The U.S formally banned the import and export of commercial ivory in 2014. However, there were still large amounts of undocumented and unregulated ivory circulating the country, particularly through online platforms such as Craigslist (IFAW 2015; Fears 2014). Lack of enforcements and loopholes in the

U.S law, such as grandfathering in sale on ivory items that are "pre-ban" or

"antique", have allowed domestic ivory markets to continue, despite the

international CITES ban (IFAW 2015). The U.S has now taken steps to close

these loopholes and has banned "virtually all sales" of African ivory items within

the U.S as of 2016 (Arnold 2016). Without any legal trade in these major

consumer countries, there are fewer venues for smuggling illegal ivory under the

guise of legal ivory (Carrington 2016). Therefore, this new policy approach may

be more successful in reducing international ivory demand than limited legal

sales were.

Stagnant Economy

The U.S ban on elephant trophy imports interacts with Zimbabwe's economy in

two ways. Firstly, this ban is a response to the economic driver that lead to

pressure of unsustainable legal hunting, as was explored in section 4.1.

Zimbabwe's quota of 500 trophy hunted elephants per year was not based on

accurate population estimates, making their legal hunting quotas potentially

unsustainable (USFWS 2015; CITES 2016). This policy response is intended to

prevent U.S tourists, who have historically accounted for nearly 40% of

Zimbabwe's trophy hunting revenue, from participating in what the U.S Fish &

Wildlife Service deemed as unsustainable legal trophy hunting (USFWS 2015).

Secondly, this policy response may negatively interact with Zimbabwe's

economic poaching driver. Before the U.S banned domestic ivory markets, trophy

ivory was still allowed to be imported. With these bans in place, tourism from

legal hunting is drastically decreasing because U.S tourists can no longer bring

back their hunting trophies (Zimbabwe Tourism Authority 2015). Zimbabwe

specifically mentioned their concerns over these economic losses in their 2015

Elephant Management Plan (Zimbabwe Parks and Wildlife Management

Authority 2015). CAMPFIRE hunting quotas from 2014 estimated that about 63%

of elephant trophies were hunted by US tourists, while other reports from private

safaris indicated that in 2013, about 40% of their CAMPFIRE contributions came

from U.S elephant sport hunters (USFWS 2015). It is therefore feasible to

conclude that the loss of U.S hunting revenue due to this U.S policy response will

result in a loss of economic revenue for Zimbabwe's tourism industry, while also

decreasing the pool of funding for elephant conservation. These two potential

ramifications as a result of this U.S policy have the potential to further stress the

economic poaching driver by decreasing revenue in the tourism sector.

4.2.2 Impact of Policy Responses on Pressures

Human-Wildlife Conflict

Human-wildlife conflicts present a poaching feedback loop as a result of a policy

response to poaching. The domestic ivory policies are a direct response to

elephant population losses (USFWS 2015). These policies are intended to assist

in the growth of elephant populations, and ultimately lead to fewer routes of

population control from activities such as trophy hunting. Drawing upon the

conclusions reached in 4.1, it has been established that human population

increases may increase wildlife conflicts, and subsequently increase poaching. If

the goal of the U.S domestic policy response is to increase elephant populations,

it is feasible that increased elephant populations may also contribute to more

instances of human-elephant conflicts as the human population increases as

well. This again would add stressors to this poaching pressure, creating a

feedback loop as a result of the U.S domestic policy response to poaching.

This concern has already been raised to the U.S Fish & Wildlife Service. In their

letter to the U.S Fish & Wildlife Service in 2015, the Safari Club International

claimed that the U.S ban on trophy imports in 2014 caused an increase of

human-elephant conflicts from 412 incidents in 2013 to 597 incidents in 2014

(USFWS 2015).

4.3 Barriers to Sustainable Hunting-Based Conservation

This section draws upon the conclusions from Sections 4.1 and 4.2 in order to

answer the last question: which aspects of this system serve as barriers to

sustainable hunting-based conservation of elephants? These results highlighted

three aspects of the poaching system that require policy interventions: stagnant

economy, human-wildlife conflicts, and political corruption, shown in Table 1.

Table 1. Barriers to Sustainable Hunting-Based Conservation

Barriers	Interactions
Stagnant economy	● Political corruption ● Legal hunting ● Poaching ● Domestic ivory ban
Human wildlife conflicts	● Domestic ivory ban
Political corruption	● Economy ● Legal hunting

Economic Stagnation

Zimbabwe's stagnant economy presents a barrier to sustainable hunting-based conservation. Political corruption contributes to this economic barrier because it prevents funds from reaching conservation efforts. As a result, the Zimbabwean government is unable to conservation ZPWMA itself, so they rely completely on donor support and hunting revenue to fund conservation programs (USFWS 2015). This leads to over hunting, which is attributed to a lack of funding for research and corrupt game reserve owners. A poaching feedback loop is the result of the stagnant economy driving poaching, which results in tourism losses. This further impairs economic growth.

The U.S domestic ivory ban also contributes to this economic barrier. This policy response may interfere with Zimbabwe's two sources of funding, donor support and hunting revenue. Firstly, donor support is unlikely to come from countries that have banned ivory trading and trophy imports or supported these bans. For example, the U.S specifically required that their funding for CAMPFIRE could not be used to support hunting-based conservation, before revoking their funding all together (USAID 2015). Since so many major international actors, such as the U.S., China, and the EU have banned domestic ivory trade (though the EU has an exception for trade of ivory acquired before 1990), it is illogical to assume that many of the Parties would contribute funds towards Zimbabwe's program, as it inherently relies on the ability to trade ivory and elephant trophies. Secondly, this growing support for and implementation of total domestic ivory bans drastically reduces the number of tourists who are legally capable of contributing towards Zimbabwe's conservation through sport hunting. These two circumstances pose significant challenges for Zimbabwe's ability to generate funds for its hunting-based conservation.

Though Zimbabwe remains committed to funding elephant conservation almost exclusively through hunting revenue, a publicized effort to encourage more traditional eco-tourism, such as photographic safaris, may draw in more donor and tourism revenue that can then be put towards conservation efforts.

Human-Wildlife Conflicts

Human-wildlife conflicts may increase due to the feedback loop caused by domestic ivory bans. The U.S ivory ban has significantly decreased the number of trophy hunters in Zimbabwe, and aims to increase elephant populations. Larger human and elephant populations increase the potential for human wildlife conflicts, which may lead to more poaching.

This potential for increased poaching is exacerbated by international decisions that are out of Zimbabwe's control. As such, the human wildlife conflict is a key area for which Zimbabwe is capable of addressing through new policy intervention. Implementing new management strategies to keep elephants and humans separate will help to keep elephant populations safe from poaching, enabling sustainable growth rates.

Political Corruption

Political corruption presents an enormous barrier to sustainable hunting-based conservation by reducing donor funds and tourism revenue. It also directly interferes with Zimbabwe's ability to conserve its wildlife through legal hunting.

Zimbabwe's political corruption has impacted its economy by deterring funding from international donors and tourism. Zimbabwe was once the "darling" of the international donor community, however major donors, including the U.S, ended their funding of Zimbabwe's CAMPFIRE program due to political corruption and

disapproval of hunting-based conservation in the early 2000's (Taylor 2009; USAID 2014). Political corruption also disrupts the tourism sector, a major source of income and job creation (World Tourism Organization 2015). Zimbabwe's political corruption and crashed economy have been blamed for deterring many tourists from the country during the first decade of the 2000's (Rihoy, Chirozva & Anstey 2010; World Tourism Organization 2015).

Political corruption also presents direct challenges to Zimbabwe's ability to perform sustainable hunting-based conservation. Political corruption resulted in an absence of scientifically sound population estimates. This yielded unsustainable legal hunting quotas, which were compounded by a lack of enforcement of these legal hunting quotas (Austin 1992; Newsweek Staff 2006; Hoyt 1994). In addition, political corruption resulted in some of the largest game reserves being owned by Mugabe's main supporters. These owners have no training for wildlife conservation, ignore the legal hunting quotas, and even enable poaching inside of protected areas (Newsweek Staff 2006).

5.0 Discussion

This section will reflect back on the three barriers discussed in the previous section to propose potential adaptation strategies to keep Zimbabwe's elephant populations healthy.

Stagnant Economy

This paper did not intend to argue for or against specific conservation methods. However, from a strictly economic perspective, a new focus on an ecotourism approach from ZPWMA may provide more financial and conservation benefits than the current hunting-based approach.

Zimbabwe's economic state acts as a barrier to hunting-based conservation because the domestic policies imposed by other countries may cut off Zimbabwe's two main sources of conservation funding. Though there is not sufficient evidence that ecotourism can completely replace funds from trophy hunting, there may be a potential for ecotourism to boost donor funding (IUCN 2016; USAID 2014). On the official ZPWMA website, there are repeated requests from "friendly countries" to donate to their "important hunting industry" to ensure that they can properly monitor poaching activity (zimparks.org). As was discussed in Section 4.3, the U.S specifically withdrew funding that was to be used for hunting-based conservation. By instead focusing on the promotion of ecotourism, countries like the U.S who oppose trophy hunting may potentially consider funding ecotourism projects.

A potential ecotourism project facilitated by increased the ZPWMA funding may involve making improvements to ZPWMA owned lodging in the National Parks, which prohibit hunting. Such improvements may encourage tourists to stay at ZPWMA-owned facilities as opposed to privately owned facilities, which would

increase direct funding to the ZPWMA. For example, the ZPWMA-owned camp

at Hwange National Park ranks 21 out of 22 lodges in the park on Trip Advisor,

with privately owned lodging scoring far higher ratings from tourists (Trip Advisor

2017). A United States Agency for International Development (USAID) report

supports such improvements. This report indicates that tourism in protected

areas has suffered in recent decades, and concludes that Zimbabwe must

"rebrand" their National Park tourism in order to revitalize tourism in the country

(USAID 2014)

It is important to note that Zimbabwe's data concerning the contribution of

ecotourism and hunting in recent years are either unavailable or contradictory,

making it nearly impossible to make an evidence-based recommendation

specifically for Zimbabwe. For example, in a meeting with USAID in 2014,

ZPWMA claimed that that 70% of their revenue in 2013 came from photographic

tourism, while hunting accounted for less than 30%. (USAID 2014). It is important

to note that the U.S and Chinese trophy important bans had not yet been

implemented at this point, which may have otherwise decreased the percentage

revenue from hunting. That being said, this ZPWMA claim to USAID directly

conflicts with ZPWMA's entire basis for their 2015-2020 Elephant Management

Plan and CITES amendment proposal (discussed in Section 2.2 and 2.1,

respectively). The management plan and CITES proposal specifically asserted

that hunting and trophy importing was necessary for conservation, as ecotourism

would not generate enough income to support their conservation efforts. Given

the lack of consistent data on these tourism statistics from Zimbabwe, there is no evidence to suggest that ecotourism will be able to replace trophy hunting revenue.

However, by potentially increasing donor funding, this strategy may provide a necessary boost to Zimbabwe's economy and anti-poaching efforts (IUCN 2016; USAID 2014). This will be necessary in light of domestic ivory bans. These potential boosts may contribute to decreased poaching, which may enable any continued legal hunting to continue at a rate that is sustainable.

Human Wildlife Conflict

Human wildlife conflicts present a barrier to hunting-based conservation by potentially increasing poaching incidents. These conflicts can be mitigated through simple and inexpensive strategies. For example, a non-profit in Tanzania has been promoting a four-step solution to mitigating human-elephant conflicts. The first step uses a high-powered flashlight, which often scares elephants away during night raids. If that doesn't work, foghorns may be used to confuse and deter the elephants. Next, a condom filled with chili powder and a firecracker can be lit and thrown towards the elephant to disorient and frighten them. As a last step measure, a large firecracker, known as a Roman candle, can be set off about 75 feet away from the aggressor elephant, which almost always deters them (Learn 2016). Since elephants have great memory, after experiencing the third and fourth steps once, the flashlight is usually enough to scare them off if

they do come back at a later time. However, this method is disruptive to surrounding communities, as the loud noises used to scare off elephants also wake up people. This method may also pose safety risks to humans, as it requires being close to the elephants.

Another successful method frequently used in Tanzania is to construct sisal string fences soaked in engine oil and ground chili around crop areas (Chang'a et al. 2016). Since constructing these fences for the last nine years, the farmers around Mikumi National Park in Tanzania have reported zero incidents of fences being broken by elephants (Chang'a et al. 2016). This method has the benefits of being low cost and less dangerous and disruptive than the four-step method.

Not only can such methods be funded and facilitated through non-profits, but they can also be funded through ZPWMA. This presents an opportunity for ZPWMA to request international funding from donors that don't wish to contribute funding towards hunting-based conservation. By reducing human-wildlife conflicts, there may be fewer instances of retaliation poaching, which may enable legal hunting to continue sustainably.

Political Corruption

Political corruption is a major barrier to sustainable hunting-based conservation, as it impacts many of the poaching drivers described in Section 4.1. As such, there is no specific policy recommendation that can address this issue as a

whole. However, it may be possible for ZPWMA to reduce its own association with the overarching political corruption within the government. While ZPWMA is certainly at an economic disadvantage without government funding, this may allow for some degree of freedom from government influence. This may allow for ZPWMA to increase transparency on their website as a very preliminary step towards decreasing the influence of political corruption. A page documenting domestic and international donors on the ZPWMA website may assist in ensuring that ZPWMA is crafting their wildlife management decisions based on sustainable science, as opposed to political and donor interests.

6.0 Conclusion

This paper aimed to understand the multiple and interacting factors that influence elephant poaching in Zimbabwe. As much of the existing literature covers specific poaching factors in isolation, such as government corruption (Bennett 2014; Nellemann 2013; Varun, Ewing, & Miller 2014), civil conflict (Lemieux & Clarke 2009; Schneider 2008), or international ivory demand (Stiles 2004), these works fail to account for situations where multiple poaching drivers create feedback loops with poaching policy responses. This paper intended to deviate from this linear analysis paradigm to take an integrated view that considered interactions across factors and feedbacks. As such, this paper also intended to account for new ivory restrictions from the last decade, for which Abensperg-Traun (2009), Frost and Bond (2007), Hutton and Leader-Williams (2003), and

Hitch (1998) could not have accounted for in their evaluations of hunting-based conservation.

The DPSIR framework introduced the interactions and feedbacks between the poaching drivers, pressures, state, impact, and responses. A major feedback loop discussed using this framework was an increased poaching risk from human-wildlife conflicts as a result of the U.S domestic ivory ban in response to poaching. Safari Club International presented this concerning feedback to the U.S Fish and Wildlife Services in response to the U.S domestic ivory ban, though they did not provide sufficient data to support these claims (USFWS 2015). Safari Club International also has a clear vested interest in promoting hunting-friendly policies, making their claims potentially biased and exaggerated.

Another key poaching feedback loop was driven by international ivory demand, in which China's ivory demand drives poaching. This increased demand makes ivory more scarce on the markets, increases its market value, and therefore makes poaching more profitable and frequent (Levin 2013; Carrington 2016). This feedback is complemented by the research of Hsiang and Sekar (2016). They came to the conclusion that flooding Asian markets with cheap ivory also has a strong potential to increase demand and poaching. They ultimately argue that the presence of any amount of ivory on the legal Asian market drives poaching because it removes the stigma associated with ivory (Hsiang & Sekar 2016). It is therefore encouraging that China is working towards the complete

closure of their domestic markets, as this may address this international ivory demand feedback.

The conclusions drawn from this framework were used to highlight the barriers that may prevent Zimbabwe from successfully continuing sustainable hunting-based elephant conservation. These barriers assisted in the identification of areas of the poaching system that may be corrected through potential policy interventions. Economic stagnation, human wildlife conflicts, and political corruption were identified as major hampering factors.

New strategies were then suggested to potentially address each barrier. A focus on ecotourism promotion from ZPWMA was recommended to potentially increase donor and tourism funds towards conservation. This marketing shift strives to address the economic poaching pressures that may make Zimbabwe's legal hunting unsustainable in light of the U.S ivory ban. However, it is important to note that there is not sufficient evidence to conclude that ecotourism can completely replace revenue from trophy hunting in Zimbabwe (IUCN 2016). Zimbabwe's 2015 Elephant Management Plan specifically argues that ecotourism will be a failed approach to conservation, though they don't provide data to support this claim (ZPWMA 2015). In addition, the same political corruption that has plagued Zimbabwe's hunting-based conservation may continue to corrode any new approaches to conservation (Mudzengi & Chiutsi 2014). Whether or not a shift towards ecotourism would actually produce the

intended benefits, Zimbabwe has clearly demonstrated their unwillingness to put forth such an attempt.

Conversely, there are simple and inexpensive management strategies for reducing human wildlife conflicts. One recommendation was the construction of chili powder infused fences to keep elephants away from crops. Such a solution could provide significant economic and conservation benefits by saving both crop yields and elephants (Chang'a et al. 2016). Lastly, increased transparency on the ZPWMA website through a donor listings page was recommended to potentially distance ZPWMA from the government's notorious political corruption. This one change does not aim to address the overarching political corruption in the country, but it may help ZPWMA gain credibility in the international community and demonstrate that their management decisions are based on science, not donor and political interests. However, even this seemingly small a change may not be possible within Zimbabwe's current political structure.

As humans face impending threats from climate change, sea level rise, and pollution, it is important that we do not overlook the species that may face extinction far sooner than us. One of many such threatened species, the African elephant, is facing a truly dire outlook at the present time. Their populations will continue to decline at unsustainable rates without attempts from their habitat range countries, like Zimbabwe, to address poaching in the very near future. Though the discussed recommendations may not completely fix Zimbabwe's

hunting-based conservation barriers, their identification may be useful in Zimbabwe's decision-making process for elephant management as ivory restrictions tighten internationally.

Literature Cited:

Abensperg-Traun, M. (2009). "CITES, Sustainable Use of Wild Species and Incentive-driven Conservation in Developing Countries, with an Emphasis on Southern Africa." Biological Conservation, 142: 948-63. doi: http://dx.doi.org/10.1016/j.biocon.2008.12.034.

Alexander, J. and McGregor, J. (2000). "Wildlife and Politics: CAMPFIRE in Zimbabwe." Development and Change, 31: 605–627. doi: 10.1111/1467-7660.00169

Arnold, C. (2016). "New U.S. Ban On Ivory Sales To Protect Elephants." NPR, http://www.npr.org/sections/thetwo-way/2016/06/02/480494835/new-u-s-ban-on-ivory-sales-to-protect-elephants.

Austin, K., Currey, D., Glaster, R., Thomton, A. & Watts, S. (1992). "Under Fire: Elephants in the Front Line." Environmental Investigation Agency Trust Ltd. London. https://eia-international.org/wp-content/uploads/Under-Fire-Elephants-in-the-Front-Line.pdf .

Bennett, E. (2014). "Legal Ivory Trade in a Corrupt World and Its Impact on African Elephant Populations." Conservation Biology, 29: 54-60. doi:10.1111/cobi.12377.

Boivin, N. L., Zeder, M., Fuller, D., Crowther, A., Larson, G., Erlandson, J., Denham, T., & Petraglia, M. (2016). "Ecological Consequences of Human Niche Construction: Examining Long-term Anthropogenic Shaping of Global Species Distributions." Proceedings of the National Academy of Sciences, 113.23: 6388-396. http://www.pnas.org/content/113/23/6388.full.pdf .

Carrington, D. (2016). "African Elephants 'killed Faster than They Are Being Born'." The Guardian, https://www.theguardian.com/environment/2016/mar/03/african-elephants-killed-faster-than-they-are-being-born.

CAMPFIRE Association. "What We Do." CAMPFIRE Association Zimbabwe, http://campfirezimbabwe.org/index.php/about-th/3-what-we-do.14 Jan. 2017.

Ceballos, G., P. R. Ehrlich, A. D. Barnosky, A. Garcia, R. M. Pringle, and T. M. Palmer. (2015). "Accelerated Modern Human-induced Species Losses: Entering

the Sixth Mass Extinction." Science Advances 1.5. doi: 10.1126/sciadv.1400253.

Chase, M. J., et al. (2016). "Continent-wide Survey Reveals Massive Decline in African Savannah Elephants." doi: 10.7717/peerj.2354.

CIA. (2016). "Country Comparison : Unemployment Rate." Central Intelligence Agency, https://www.cia.gov/library/publications/the-world-factbook/geos/zi.html. 04 Jan. 2017.

CIA. (2016). "The World Factbook: ZIMBABWE." Central Intelligence Agency, https://www.cia.gov/library/publications/the-world-factbook/geos/zi.html. 04 Jan. 2017.

CITES. (1973). "Article IV." Text of the Convention. Proc. of Convention on International Trade in Endangered Species of Wild Fauna and Flora, Washington, D.C. 1973. https://cites.org/sites/default/files/eng/disc/CITES-Convention-EN.pdf.

CITES. (2016). "Final Decisions Made at CoP17 on the Proposals to Amend CITES Appendices." Proc. of Convention on International Trade in Endangered Species of Wild Flora and Fauna, South Africa, Johannesburg. https://cites.org/sites/default/files/eng/cop/17/Decisions-on-amendment-proposals.pdf.

CITES. (2008). "Ivory Auctions Raise 15 Million USD for Elephant Conservation." https://cites.org/eng/news/pr/2008/081107_ivory.shtml.

CITES. (2016). "Proposal 15." Consideration of Proposals for Amendment of Appendices I and II. Proc. of Convention on International Trade in Endangered Species of Wild Flora and Fauna, South Africa, Johannesburg. October 2016. 1-31. https://cites.org/sites/default/files/eng/cop/17/prop/060216/E-CoP17-Prop-15.pdf.

CITES Secretariat. (2016). "Current Rules on Commercial International Trade in Elephant Ivory under CITES and Proposals to CITES CoP17." https://cites.org/eng/news/Current_rules_commercial_international_trade_elephant_ivory_under_CITES_Proposals_CITES_CoP17_200716.

CITES. (2016). "What Is CITES?" https://cites.org/eng/disc/what.php. 03 Jan. 2017.

Corn & Fletcher 1997. United States. Cong. Environmental and Natural Resources Division. African Elephant Issues: CITES and CAMPFIRE. 105th Cong., 1st sess. Cong. Rept. 97-752. http://www.elephantsforever.co.za/docs/Pcaaa791.pdf.

Degeorges, P. A, and Reilly, B.K. (2009). "The Realities of Community Based Natural Resource Management and Biodiversity Conservation in Sub-Saharan Africa." Sustainability 1.3: 734-88. doi: 10.3390/su1030734.

Dickson, B. (2002). "International Conservation Treaties, Poverty and Development: the case of CITES." Natural Resource Perspectives, 1-4. Overseas Development Institute, https://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/2813.pdf.

Doukakis, P., Pikitch, K., Rothschild, A., Desalle, R., Amato, G., and Kolokotronis, S. (2012). "Testing the Effectiveness of an International Conservation Agreement: Marketplace Forensics and CITES Caviar Trade Regulation." doi:10.1371/journal.pone.0040907.

Fears, D. (2014). "New Rules Will Ban Import and Export of Ivory, and Make It Harder than Ever to Sell." The Washington Post, https://www.washingtonpost.com/national/health-science/new-rules-will-ban-import-and-export-of-ivory-and-make-it-harder-than-ever-to-sell/2014/02/11/de666c5a-934e-11e3-84e1-27626c5ef5fb_story.html?utm_term=.2eef79c5d1ef.

Frost, P. G.h., and Bond, I. (2008). "The CAMPFIRE Programme in Zimbabwe: Payments for Wildlife Services." Ecological Economics 65.4: 776-87. http://dx.doi.org/10.1016/j.ecolecon.2007.09.018.

Fuchs, C. (2010). "Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)—Conservation Efforts Undermine the Legality Principle." German Law Journal: 9.11. doi: 10.1007/978-3-642-04531-8_17.

Gandiwa, E., Heitkönig, I., Lokhorst, A., Prins, H., and Leeuwis, C. (2013)."CAMPFIRE and Human-Wildlife Conflicts in Local Communities Bordering Northern Gonarezhou National Park, Zimbabwe." Ecology and Society 18.4. http://dx.doi.org/10.5751/ES-05817-180407.

Hitch, S. (1998). "Losing the Elephant Wars: CITES and the 'Ivory Ban'", 27 Ga. J. Int'l & Comp. L. 167. http://digitalcommons.law.uga.edu/cgi/viewcontent.cgi?article=1316&context=gjicl.

Hsiang, S., and Sekar, N. (2016). "Does Legalization Reduce Black Market Activity? Evidence from a Global Ivory Experiment and Elephant Poaching Data." The National Bureau of Economic Research. doi: 10.3386/w22314.

Hutton, J. M., and Leader-Williams, N. (2003). "Sustainable Use and Incentive-driven Conservation: Realigning Human and Conservation Interests." Oryx 37.02. https://doi.org/10.1017/S0030605303000395.

Kristensen, P. (2004). "The DPSIR Framework." Denmark Department of Policy Analysis. National Environmental Research Institute, http://wwz.ifremer.fr/dce/content/download/69291/913220/file/DPSIR.pdf.

Kao, E. (2016). "Hong Kong Plan to Ban Ivory Trade by 2021 Receives Executive Council Go-ahead." South China Morning Post, http://www.scmp.com/news/hong-kong/health-environment/article/2056411/hong-kong-plan-ban-ivory-trade-2021-receives.

Lemieux, A. M., and R. V. Clarke. (2009). "The International Ban on Ivory Sales and Its Effects on Elephant Poaching in Africa." British Journal of Criminology 49.4: 451-71. doi:10.1093/bjc/azp030.

Levin, D. (2013). "From Elephants' Mouths, an Illicit Trail to China." The New York Times, http://www.nytimes.com/2013/03/02/world/asia/an-illicit-trail-of-african-ivory-to-china.html.

Madhusudan, M. D. and Sankaran, P. (2010). "Seeing the Elephant in the Room: Human-Elephant Conflict and the ETF Report." Economic and Political Weekly 45.49: 29–31. http://www.jstor.org/stable/27917931.

Mantyka-Pringle, C. S., Visconti, P., Di Marco, M., Martin, T., Rondinini, C., and Rhodes, J. R. (2015). "Climate Change Modifies Risk of Global Biodiversity Loss Due to Land-cover Change." Biological Conservation 187:103-11. http://dx.doi.org/10.1016/j.biocon.2015.04.016.

Moyo, J. and Onishi, N. (2016). "A Cashless Economy in Zimbabwe? With Little Cash, There's Little Choice." The New York Times, https://www.nytimes.com/2016/11/04/world/africa/zimbabwe-robert-mugabe-cash-debit-cards.html?_r=0.

Mudzengi, B.K. and Chiutsi, S. (2014). "Socio-political and macro-economic factors influencing ecotourism competitiveness in Zimbabwe". International Journal of Development and Sustainability 3.2: 306-314. ISSN: 2168-8662.

Nellemann, C. (2013). "Elephants in the Dust: The African Elephant Crisis: A Rapid Response Assessment". Nairobi, Kenya: UNEP, CITES, IUCN, TRAFFIC. ISBN: 978-82-7701-111-0.

Nellemann, C., Henriksen, R., Raxter, P., Ash, N., Mrema, N., and Pravettoni, R. (2014). "The Environmental Crime Crisis: Threats to Sustainable Development from Illegal Exploitation and Trade in Wildlife and Forest Resources". Nairobi, Kenya: United Nations Environment Programme. ISBN: 978-82-7701-132-5.

Neslen, A. (2016). "African Wildlife Officials Appalled as EU Opposes a Total Ban on Ivory Trade." The Guardian https://www.theguardian.com/environment/2016/jul/06/african-wildlife-officials-appalled-as-eu-opposes-a-total-ban-on-ivory-trade.

New Zimbabwe. (2016). "Zim Highly Corrupt Country, Watchdog." New Zimbabwe, http://www.newzimbabwe.com/news-27386-Zim+highly+corrupt+country,+watchdog/news.aspx.

Nkala, O. (2015). "How Black-Market Poison Is Helping Poachers Kill Animals." National Geographic, http://news.nationalgeographic.com/2015/11/151124-zimbabwe-elephants-cyanide-poaching-hwange-national-park-africa/.

Padgett, B. (1995). "The African Elephant, Africa, and CITES: The Next Step." Indiana Journal of Global Legal Studies: 2.2: 529-552. http://www.repository.law.indiana.edu/ijgls/vol2/iss2/9.

Rosen, R. J. (2012). "What Is It About an Elephant's Tusks That Make Them So Valuable?" The Atlantic, https://www.theatlantic.com/business/archive/2012/09/what-is-it-about-an-elephants-tusks-that-make-them-so-valuable/262021/.

Sayuni, M. B., Svarstad, H., and Benjaminsen, T. A. (2015). "Elephants over the Cliff: Explaining Wildlife Killings in Tanzania." Land Use Policy 44: 19-30. http://dx.doi.org/10.1016/j.landusepol.2014.10.018.

Sieff, K. (2015). "Zimbabwe's White Farmers Find Their Services in Demand Again." The Guardian, https://www.theguardian.com/world/2015/sep/25/zimbabwe-land-reforms-mugabe-white-farmers.

Stiles, D. (2004). "The Ivory Trade and Elephant Conservation." Environmental Conservation 31.4: 309-21. https://doi.org/10.1017/S0376892904001614.

Suich, H., Child, B., and Spenceley, A. (2009). "Chapter V." Evolution and Innovation in Wildlife Conservation Parks and Game Ranches to Transfrontier Conservation Areas. London: Earthscan. 410-12. ISBN : 9781844076345.

Swanson, A. (2014). "How China's Ivory Addiction Explains the New World Economy." The Washington Post, https://www.washingtonpost.com/news/wonk/wp/2014/11/07/how-chinas-ivory-addiction-explains-the-new-world-economy/?utm_term=.da3dc6ea3c63.

Transparency International. (2016). "Zimbabwe." Transparency International, https://www.transparency.org/country/ZWE .04 Jan. 2017.

USFWS. "African Elephants.". U.S Fish and Wildlife Service International Affairs, https://www.fws.gov/international/animals/african-elephants.html . 04 Jan. 2017.

USFWS. (2013). "CITES & Elephants." U.S. Fish & Wildlife Service. U.S. Fish & Wildlife Service International Affairs, https://www.fws.gov/le/pdf/CITES-and-Elephant-Conservation.pdf. 04 Jan. 2017.

USFWS. (2016). "CITES Members Urged to Close Domestic Ivory Markets." US FWS News Release, https://www.fws.gov/international/pdf/CoP17-Domestic-Ivory-Markets-USFWS.pdf.

USFWS. (2016). "U.S. Votes "No" on CITES Appendix-I Uplisting of Elephants - Here's Why." U.S. Embassy & Consulates in South Africa. US Department of State, https://za.usembassy.gov/u-s-votes-no-cites-appendix-uplisting-elephants-heres/.

Vira, Varun, Thomas Ewing, and Jackson Miller. (2014)."Out of Africa: Mapping the Global Trade in Illicit Elephant Ivory." Economic and Political Weekly: 32.25. http://www.wwf.se/source.php/1578610/out%20of%20africa.pdf.

Wadhams, N. (2007). "Zimbabwe's Wildlife Decimated by Economic Crisis." National Geographic, http://news.nationalgeographic.com/news/2007/08/070801-zimbabwe-animals.html.

Williams, M., J. Zalasiewicz, P. Haff, C. SchwaÂ Gerl, A. D. Barnosky, and E. C. Ellis. (2015). "The Anthropocene Biosphere." The Anthropocene Review 2.3: 196-219.
doi: 10.1177/2053019615591020.

Wittemyer, G., J. M. Northrup, J. Blanc, I. Douglas-Hamilton, P. Omondi, and K. P. Burnham. (2014). "Illegal Killing for Ivory Drives Global Decline in African Elephants." Proceedings of the National Academy of Sciences 111.36:13117-3121. doi: 10.1073/pnas.1403984111.

The World Bank. (2015). "World Development Indicators." The World Bank, http://databank.worldbank.org/data/reports.aspx?source=world-development-indicators. 07 Jan. 2017.

Zimbabwe Parks and Wildlife Management Authority. (2015). "Zimbabwe National Elephant Management Plan (2015-2020)." Conservation Action Trust, http://www.zamsoc.org/wp-content/uploads/2016/04/ZIMBABWE-ELEPHANT-MANAGEMENT-PLAN-APPROVED-FINAL-1.pdf. 15 Jan. 2017.

Zimbabwe Parks and Wildlife Management Authority. (2016). "Zimbabwe Parks and Wildlife Management Authority, ZimParks, Successfully Exports 35 African Elephants to China." http://www.zimparks.org/index.php/mc/279-zimbabwe-parks-and-widlife-management-authority-zimparks-successfully-exports-35-african-elephants-to-china. 01 Mar. 2017.

Zimbabwe Tourism Authority. (2016). "Tourism Trends and Statistics Report." Zimbabwe Tourism Authority, http://www.zimbabwetourism.net/index.php/trends-statistics/. 26 Jan. 2017.