

ABSTRACT

BASHARI, MUJTABA. Study of Wildlife Poaching and Illegal Wildlife Markets in Afghanistan: Impacts of Poaching and Illegal Markets on the Condition of Afghanistan's Wildlife. (Under the direction of Dr. Fred Cabbage).

The motivations for wildlife poaching have been well studied in particular countries and regions, as have the operations of specific illegal wildlife markets wherein poached animals are bought and sold. However, it is critically important to study wildlife poaching, its motivations, and its illegal markets in each individual region because the features of the phenomenon vary widely from country to country. This study investigates wildlife poaching and illegal wildlife markets in Afghanistan, where the problem is pervasive in the wake of decades of civil war and poverty, threatening the region's biodiversity. This thesis reports on the use of two different methods to understand the illegal hunting and trade in Afghanistan. First, Chapter 1 provides background on the country, its wildlife, and its illegal markets. Then, Chapter 2 describes a meta-analysis that was performed for this study using 157 full-text articles on poaching drivers and markets for Afghanistan's wildlife. Of 157 studies, 32 were systematically reviewed for quantitative analysis. Some studies for countries in Afghanistan's neighboring region served as benchmarks and thus were also included in the systematic literature review. In Chapter 3, two kinds of data are reported: data collected from face-to-face interviews and from web-based surveys ($N = 57$), which were performed in three different geographical areas of Afghanistan. Hunters, vendors in wildlife markets, and experts were all asked about motivations for poaching and the function of the markets.

The results from the meta-analysis of Chapter 2 and the survey of Chapter 3 revealed that the most important poaching drivers are the fur trade, the trade in horn and other byproducts, retaliation killing, pet and live trade, and family consumption. Most of the poachers in this study identified themselves as Afghan citizens; however, some were from other countries, especially from Pakistan and Middle Eastern countries. The study found that poachers usually transported their takes to market by themselves or sell to peddlers, who then brought the takes to provincial and national markets where they could be sold at higher prices. This study found a significant linear relationship between poaching drivers and wildlife condition, and between poaching drivers and hunting intensity. In addition, education levels were found to have a significant statistical relationship with wildlife conditions.

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Study of Wildlife Poaching and the Illegal Wildlife Market in Afghanistan: Impacts of
Poaching and Illegal Markets on the Condition of Afghanistan's Wildlife

by
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DEDICATION

I dedicate my thesis to my parents, who always supported and inspired me to achieve this great success.

BIOGRAPHY

Mujtaba Bashari was born August 22, 1986, in Kabul, Afghanistan. Mujtaba grew up playing volleyball and soccer, and generally enjoying fitness. In 2009, he earned his B.Sc. from Kabul University, Faculty of Agriculture, Department of Forestry and Natural Resources. While studying for his B.S. at Kabul University, he performed research in various subjects, such as the compost production process and Integrated Pest Management (IPM). When Mujtaba was an undergraduate student, he became interested in natural resources policy and environmental conservation. He decided to dedicate his graduate studies to natural resources and environmental policy and work for the Afghanistan government in natural resources conservation. To achieve his objective, Mujtaba started work at Kabul University as a teaching assistant as well as with the Wildlife Conservation Society (WCS)'s Afghanistan program. He served WCS in different positions, including Assistant Program Manager and Training and Capacity Development (TCD) officer. After a few years of gaining academic and professional experience at Kabul University and in the WCS-Afghanistan program, he came to the United States through an assistantship with the United States Agency for International Development (USAID). He first went to Purdue University, Indiana, where he completed his post-Baccalaureate in the Department of Forestry and Natural Resources; then, he transferred to North Carolina State University (NCSU), College of Natural Resources, Department of Forestry and Environmental Resources to undertake his master's studies.

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CHAPTER 1

Introduction

The patterns of and motivations for poaching, the illegal taking of wildlife, vary across social, cultural, religious, and economic situations. For example, Kahler (2012) found that the main reason that people poach in Namibia is to generate income and food, while Ayling (2013) reported that in southern Africa, organized crime plays a key role in rhino poaching. Because the drivers of poaching vary from country to country, it is important to assess the situation in a particular region before developing a response for that region. In Afghanistan, three decades of wars have had devastating impacts on the social and political systems, the infrastructure, the economy, and the environment, and thus it has been difficult to conduct research on any of these topics. As a result, there is very little literature on the status of and threats to the wildlife in Afghanistan. In particular, researchers dispute the role of national and international black markets in driving the poaching phenomenon.

The objective of this thesis is to help build understanding of what motivates poachers and of how black markets for wildlife function in Afghanistan. Specifically, we identify the motivations for and drivers of poaching, examine the market flows of wildlife products and their impact on various species, and assess opportunities to better track market flows and protect the wildlife of Afghanistan. These issues have not been comprehensively studied by other researchers, yet they are of critical importance for wildlife conservation agencies and policymakers in Afghanistan.

Based on these research questions and objectives, we conducted a systematic review of the literature on wildlife poaching in Afghanistan and neighboring countries such as Pakistan, Iran, India, and some of the Central Asian countries. In addition, we surveyed poachers, shopkeepers in wildlife markets, community representatives, and those who had scientific backgrounds and working experience with environmental organizations about the status of wildlife and the drivers of poaching. Based on both the literature and the survey, we identify the most important drivers of poaching, and we explore variations across different categories of wildlife and different regions of Afghanistan. In addition, we map the key flows of wildlife products within and outside of Afghanistan, and we propose a system for tracking these flows.

This thesis has four chapters. In this introductory chapter, we provide general background on Afghanistan. The second chapter presents a systematic review of the available literature on poaching in Afghanistan. The third chapter reports on a survey of key informants in Afghanistan. Finally, the fourth chapter provides an overall conclusion, makes policy recommendation, and suggests future research and studies.

Background

Afghanistan, officially the Islamic Republic of Afghanistan, is a mountainous country located mostly in southern and central Asia, with some of its landmass extending into western Asia. Afghanistan is a landlocked territory that shares its borders with Tajikistan, Uzbekistan, and Turkmenistan in the north; China in the northeast; Pakistan in the southeast; and the Islamic Republic of Iran in the west. The total area of Afghanistan is 652,864 km², and its current total population totals 26.5 million people, with a settled population of 25 million people (Central Statistic Organization [CSO] 2011).

Seventy to 80% of the population of Afghanistan is directly and indirectly reliant on agriculture, animal husbandry, and the country's natural resources. Therefore, Afghanistan's natural resources play a key role in the country's economic, social, and political stability (United Nations Environment Program [UNEP], 2013).

The nation's environmental degradation and the threats to its wildlife are mostly rooted in the three decades of war that have devastated Afghanistan. It was in 1979 that the Soviets first occupied Afghanistan, and in 1991, they left behind a devastated country. In the generation-long war, the negative effects on Afghanistan have not just been environmental; the nation has also lost social, economic, and political systems. The adverse impacts from this invasion will continue into the future (Formoli, 1995). After the Soviet invasion, Afghanistan experienced almost 20 years of civil war. During this time, no research was done, and most of the previous data were lost. Afghanistan's natural resources, like its other resources, were decimated. According to the United Nations Environment Program (UNEP, 2003).

Afghanistan's forests and woodlands were overharvested—as they still are—for fuel wood, construction, shelter, and general survival purposes. UNEP's satellite analysis reveals that since 1978, just before the Soviet invasion started, almost 50% of eastern Afghanistan conifer forests in the Nangarhar, Nuristan, and Kunar provinces were eliminated. Forests, woodlands, and wetlands are very important wildlife habitats. The survival of wildlife is directly related to the health of their habitat; therefore, the loss or degradation of habitats means the loss and extinction of wildlife.

According to UNEP's (2003) Post-Conflict Environmental Assessment, after a long civil war and the Soviet Union's invasion of Afghanistan, Afghanistan's natural and human resources collapsed, and its vulnerability to natural disasters and food shortages increased rapidly. Formoli (1995) stated that during the war, most people faced food and fuel shortages, and that this had very bad effects on wildlife and their habitats. During this period, people's dependency on natural resources increased. As of 2006, most of the people (78%) lived in the countryside, and out of this number, almost 68% were classified as economically "poor" (United Nations Development Programme [UNDP], 2006). Most of these poor people, particularly the families, survived on natural resources either directly or indirectly. As a result, wildlife and their habitats suffered exploitation. People cut forests and woodlands for fuel, nuts, and construction. They also killed wildlife for meat and pelts; as retaliation for killing livestock; and for sales in international markets. Most of Afghanistan's wildlife, such as snow leopard (*Uncia uncia*) and Marco Polo sheep (*Ovis ammon polii*) are widely hunted for family consumption, furs, and sport, and for export to international markets UNEP (2003a).

Research Objective

Afghanistan's three decades of war and its resulting loss of infrastructure have had negative social, political, economic, and environmental effects. During this tumultuous period, no research was done or published. Therefore, the status of wildlife and the threats against it remain unknown. There is no solid research or assessment to address the magnitude of the wildlife poaching all over Afghanistan. The role of national and international black markets in Afghanistan's wildlife protection remains disputed. Understanding poacher motivations and the function of the black market is critically important for wildlife management and conservation. Therefore, the purpose of this study was to determine the motivations for and drivers of poaching in the context of Afghanistan. Moreover, in this research we tested the impact of wildlife markets on wildlife protection, and we drew the Afghanistan wildlife market flow and protection opportunities. We sought answers to these questions for two important reasons. First, these questions have not been comprehensively studied by other researchers. Second, the answers to these questions will be valuable for wildlife conservation agencies and policymakers who manage natural resources, as these stakeholders need to understand the drivers of wildlife poaching and the function of the illegal wildlife markets in Afghanistan. Having little or no information has made the situation difficult for policymakers thus far. This research will also be helpful for those who are working in natural resources management and conservation issues in other similar, nearby countries.

Based on our research questions and objectives, we performed a meta-analysis of the literature on wildlife poaching in Afghanistan and the other countries in the region, such as Pakistan, Iran, India, and some of the Central Asian countries. In addition, we developed a questionnaire to ask poachers, wildlife exchange market shopkeepers, communities, and experts about wildlife poaching drivers and illegal wildlife markets.

We explored the relationships among and magnitude of various poaching drivers. First, we determined whether variables (i.e. retaliation, family consumption, fur trade) have a relationship with poaching in Afghanistan; second, we explained which variables are the most important and which ones are less so. In addition, we determined the direction and magnitude of the flow of wildlife in Afghanistan, and we presented a method or system to track this flow.

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CHAPTER 2

A Meta-Analysis of Afghanistan's Wildlife Poaching and Illegal Markets

Introduction

The problem of poaching, the illegal hunting of wildlife, in least developed countries such as Afghanistan has not been at the center of attention and might not be widely considered a serious problem. Indeed, for many years, wildlife illegal hunting was not considered as a serious problem even in modern, developed societies (Muth 1998). Yet, in recent years, poaching motivations and drivers have been well studied and reported in other countries. For example, research has found that when wildlife in North America are targeted for poaching, the motivations are usually commercial purposes, household consumption, recreation, trophy, thrill killing, retaliation killing and self-protection, among other reasons (Muth 1998). However, because Afghanistan experienced three decades of foreign and civil wars, there are not enough comprehensive studies to address motivations for wildlife poaching in Afghanistan. Since the fall of the Taliban government and the establishment of a new democratic government, some environmental governmental organizations such as the National Environmental Protection Agency, as well as non-governmental organizations, have been established and have performed some research on wildlife conservation and management.

To fill the research gap discussed above, we performed a meta-analysis of the relevant literature. The purpose was to understand and explain the factors and drivers of poaching and

the impacts of wildlife trade on wildlife protection in Afghanistan as well as to draw the Afghanistan wildlife market flow and protection opportunities.

This study was carried out for two main purposes. First, Afghanistan wildlife poaching drivers and illegal markets have not been comprehensively studied by any other researchers. Second, understanding these two question—what drives poaching and how do the illegal markets function—is very important for wildlife conservation agencies, policymakers, and any other people who are involved in natural resource conservation activities. Having little or no information makes the work of policymakers and decision-makers difficult.

Our meta-analysis covered the literature on wildlife poaching and illegal wildlife markets in Afghanistan and in some other countries in the region, such as Pakistan, Iran, India, and Central Asian countries. We explored the magnitude of poaching drivers and the direction of illegal wildlife markets. This involved explaining which poaching motivations were most and least important in determining the volume and types of poaching: family consumption, medicinal purposes; trophy hunting; live trade; fur, horn or ivory trade; taxidermy; international demand; commercial values; gun availability; and retaliation killing. In addition, we determined the direction and magnitude of the flow of wildlife in Afghanistan. Specifically, a method or system was presented to track wildlife flow, that is, how Afghanistan's wildlife species and wildlife products were transported from hunting areas to provincial, national, and international markets.

Research Methodology

A meta-analysis is a systematic literature review that identifies and quantifies prior research findings. The analysis provides insight into factors and variables in the studies of other researchers. For this project, we analyzed other researchers' outputs in the form of scientific journal articles, reports, governmental working documents, theses, dissertations, and other gray literature. The following procedures were followed for the data collection process.

Determining keywords and themes. In the first stage of this research, we performed meta-analysis of wildlife poaching and hunting in Asia. To answer the questions stated in our objectives, we first identified the following keywords: meta-analysis methods; wildlife conservation; illegal wildlife trade; poaching drivers; wildlife international demand; wildlife national demand; house wealth and wildlife consumption; poverty and wildlife consumption; wildlife medical usages; wildlife fur and by-product; gun availability; technology and wildlife hunting; wildlife retaliation; wildlife live trade; trophy hunting; Afghanistan wildlife poaching motivation; road access; wildlife trade/market in Asia; wildlife trade/market in Afghanistan; wildlife trade/market in Pakistan; wildlife market/trade in Tajikistan; wildlife market/trade in Iran; wildlife trade/market in China; Wildlife trade/market in Arabian countries; wildlife supply chain mapping; wildlife market chain; wildlife trade flow; wildlife market/trade in Afghanistan; Ka Farushi bird market; Chicken Street market; Afghanistan wildlife endangered species; snow leopard; Marco polo sheep; Ibex (*Capra ibex*); Markhor (*Capra falconeri*);

Black bears (*Ursus thibetanus*) and brown bears (*Ursus arctos*); wildlife control and protection; rangers; and other essential terms and keywords.

Search for data. We accessed a wide range of data to capture essential information. The first step for information gathering was the systematic literature search. We complemented this method by checking references and contacting the authors and subject-matter experts (Center for Evidence-Based Conservation [CEBC], 2009).

Our literature search contained the three following steps:

1. Web search (Google)
2. Search of online databases and catalogues
3. Search of organizations and professional networks

Web searching. We used Google to search for ongoing and unpublished articles, reports, surveys and other scientific papers, as well as to find relevant experts and appropriate organizations (CEBC, 2009). We also searched the bibliographies of articles to find appropriate secondary literatures (Benítez-López et al, 2010).

Searching online databases and catalogues. We searched scientific electronic databases that are useful in gathering the relevant articles and scientific works. These databases included Science Direct, Springer Link (Benítez-López et al, 2010), Web of Science, and Scopus (CEBC, 2009). To ensure that our literature search was unbiased, we collected empirical studies and scientific papers including research articles, Ph.D. dissertations, M.S.

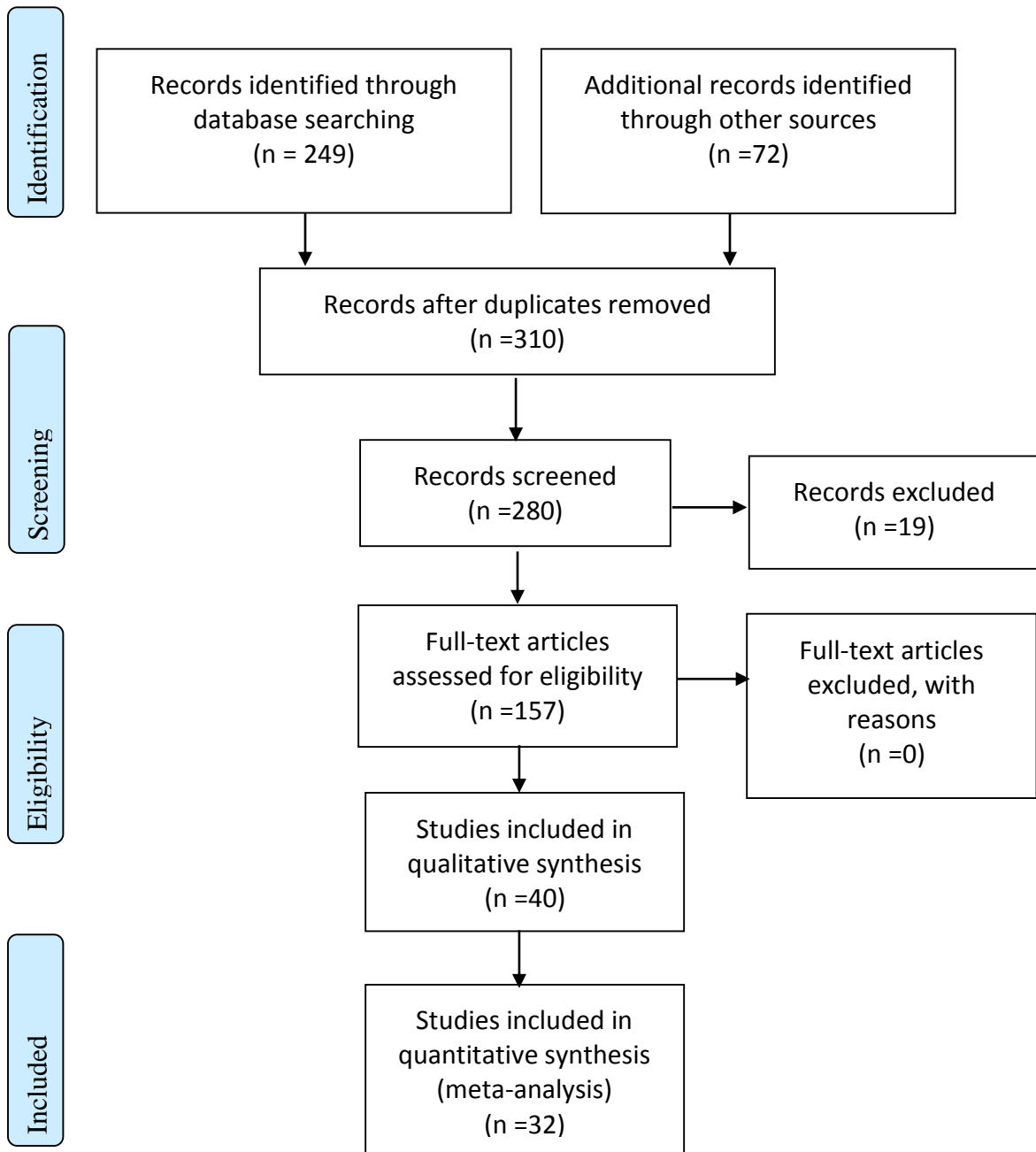
theses, gray literatures, and peer-reviewed and non-peer-reviewed published articles (Benítez-López et al, 2010).

Searching organizations and professional networks. We also searched the materials of organizations and professional networks (CEBC, 2009), particularly Afghanistan's governmental organizations that are responsible for wildlife management, such as the Natural Resource Management general directory of the Ministry of Agriculture, Irrigation and Livestock (MAIL), the National Environmental Protection Agency (NEPA), and other relevant organizations and institutions. In addition, we checked with relevant non-governmental organizations (NGOs), including the Wildlife Conservation Society (WCS) – Afghanistan program. Because all these organization are in Afghanistan, direct contact with experts was difficult. Therefore, most of the experts were contacted through email and phone.

Data selection process. For selecting the articles and papers, we used the PRISMA flow diagram (Moher et al., 2009). All papers were collected through four specific processes: identification, screening, eligibility, and included criteria. At the first step, a total of 321 articles were found through specific databases such as Science Direct, Springer Link (Benítez-López et al., 2010), Web of Science, and North Carolina State University libraries website (n = 249) and through other sources (n = 72). After removing duplicated papers and articles, and screening in stages, we found 157 eligible papers for this study. Of those 157 studies, 32 studies were used in a quantitative synthesis (meta-analysis) and the rest of the studies (n = 40) were used in a qualitative synthesis for Afghanistan and regional countries such as Pakistan, Iran, India, and other countries (Table 1).

We used both published and unpublished studies, including organizational reports, technical reports, surveys, and other material that was not published in journals. Of the 32 studies in this section, 14 studies had been published and 18 were unpublished materials. In terms of study methodology, of the 32 studies, 22 studies were qualitative and 11 were quantitative.

Table 1: Results of data collection and screening procedure for meta-analysis study



Data-screening criteria. Once we completed searching, the next step was to review data from the collected articles (CEBC, 2009). The selection of articles was guided by the topic questions that we had established to help us meet our objectives. The process had three main phases:

- (1) **Title:** We selected those sources whose titles included any of our pre-identified keywords, such as “wildlife conservation”; “illegal wildlife trade”; “poaching motivation”; “wildlife international demand”; “wildlife national demand”; and others as described above in the section entitled “Determining keywords and themes.”
- (2) **Abstracts:** We selected all of the articles’ abstracts that discussed motivation for illegal hunting or wildlife markets in Afghanistan.
- (3) **Entire Paper:** Papers that contained targeted keywords and met the abstract criteria were selected to be read in their entirety. We stored necessary information in an Excel database for the data analysis section. We retained all relevant data and articles for further studies and for the data extraction phase (CEBC, 2009).

Table 2: Legends and codes used for poaching drivers, wildlife market, species type, publication type, and method

Codes for poaching drivers	
2	Yes, factor is the most important driver
1	Yes, factor is a driver
0	No, factor is not a driver

Codes for Market	
2	Yes, most important market
1	Yes, market
0	No, market
-9	Did not study

Species Type	
1	
3	Carnivores
0	Other Categories' species

Method	
0	Qualitative
1	Quantitative

Publication Type	
0	Unpublished
1	Published

Statistical data analysis: Three statistical methods can be used to summarize and analyze the results of a meta-analysis: (1) vote-counting, (2) combined test, and (3) probability transformation (Yang, 2005). Of the three methods, we used the vote-counting method. This method provides a suitable starting point for a systematic assessment of different studies and papers (Pattanayak, Mercer, Sills & Yang, 2003). We counted the number of studies and papers that found a statistically significant result. For example, we explored whether there were a positive correlation between retaliation and poaching. Then, we summed up the number of votes and, using this information, identified the correlation between response variables (poaching) and explanatory variable (drivers) (Pattanayak et al., 2003). We sorted the results of each study into three categories: positive significant, negative significant, and non-significant.

Result

Afghanistan Overall poaching drivers

In this study, we identified 13 independent variables (poaching driver factors) to test in order to determine whether these variables had a significant impact on wildlife poaching in Afghanistan. Poaching drivers such as family consumption (meat), medicinal usage, trophy hunting, decoration, pet trade, fur, horn/ivory, taxidermy, international demand, commercial value, gun availability, retaliation, and other reason were tested individually. Because different wild animals are poached for different purposes, we classified and codified species into four types based on their nature and habits: carnivores, antelopes, birds, and other categories of species. The other categories included those species that did not fall into those three categories, including all insects, reptiles, and mammals that are neither antelopes nor carnivores (ie. rhinos and elephants). Other categories included species that were not specified in the studies used in this analysis.

In the first stage of analysis, we analysed the data generally. This means that we analyzed the poaching drivers without considering species types. Later, we analyzed independent variables based on species types.

For this analysis, we had compiled 32 studies, which gave us 179 cases and 251 samples. Each study contained one or more cases, and each case covered one or more samples. Each case represented only one species and could have many poaching drivers. Poaching drivers were weighted based on their relative importance; the intensity with which authors

mentioned the drivers in their studies were converted into code. We used codes such as 0 (factor is not a driver), 1 (factor is a driver), or 2 (factor is the most important driver) (Table 3; Appendix A for further details).

Each driver contained five columns: Column 0, column #1, column #2, column $0+\#1+\#2$, and column #1. Column $0+\#1+\#2$ is sum of column 0, #1 and #2, shows the sample size for each driver. However, column #1 represented the volume and magnitude of poaching drivers. It should be noted that column #1 does not necessarily mean that is simply sum of column 1 and 2, because column 2 has double the weight of column 1; therefore, the formula for column #1 is: $\text{Column } 2*2 + \text{column } 1$. To understand the magnitude of the independent variables with dependent variables, columns #1 and #2 were summed based on the above formula, and results were recorded in column #1 (Table 3).

The results of our meta-analysis revealed that, overall, Afghanistan's wildlife species were most likely to be poached for fur purposes, followed by retaliation killing. Of the total of 252 samples, 22 samples mentioned the fur trade as a poaching driver for Afghanistan wildlife (code 1), and 44 samples mentioned fur trade as the most important driver (code 2). Thus, 62.6% of the samples indicated fur trade as either a driver or the most important driver (Figure 1). Only four samples from one study stated that the fur trade was not a driver of poaching (Table 3).

The second important poaching driver that was reported was retaliation killing. Thirteen samples mentioned retaliation killing as a driver of poaching in Afghanistan (code 1),

and 44 samples of 17 studies reported that retaliation killing of wildlife was the most important driver (code 2) (Table 3). Based on this study, 56.4% of illegal hunting happened because the wild species, particularly predators, attacked communities' livestock and poultry, or harmed their crops and created economic damage (Figure 1). Only two samples from two studies stated that retaliation killing was not a driver of poaching (Table 3). Meanwhile, the magnitude of other factors, such as live trade, family consumption, gun availability, and commercial value were reported 25%, 23%, 20%, and 11% respectively (Figure 1). The other poaching drivers represented a small proportion of impact, however. For example, poaching for taxidermy purposes was reported only by one study, comprising only 0.5%. Other factors that were listed under "other drivers" included hunting for sport or hawking, which comprised 15% (Figure 1). Some studies reported that some of factors are not drivers. For example, four samples (2%) stated that Afghanistan wildlife are not targeted for poaching due to their fur.

Table 3: Summary of results of the vote counting meta-analysis for overall Afghanistan poaching drivers

* 0=factor is not a driver, #1=factor is a driver, #2=factor is the most important driver, 0+#1+#2= total sample size for each driver, #1+#2=Volume and magnitude of drivers

Codes →	0*	#1	#2	0+#1+#2	#1&#2
Hunting Drivers ↓					
Family Consumption	3	2	20	25	42
Medicine	0	1	6	7	13
Trophy	1	3	1	5	5
Decoration	0	1	1	2	3
Live Trade	0	5	20	25	45
Fur and Other Byproduct	4	22	45	71	112
Horn and Ivory	0	2	1	3	4
Taxidermy	0	1	0	1	1
International Demand	0	1	4	5	9
Commercial Value	1	1	9	11	19
Gun Availability	0	6	15	21	36
Retaliation	2	13	44	59	101
Other Reasons	0	8	9	17	26
Total # of Samples	11	66	175	252	

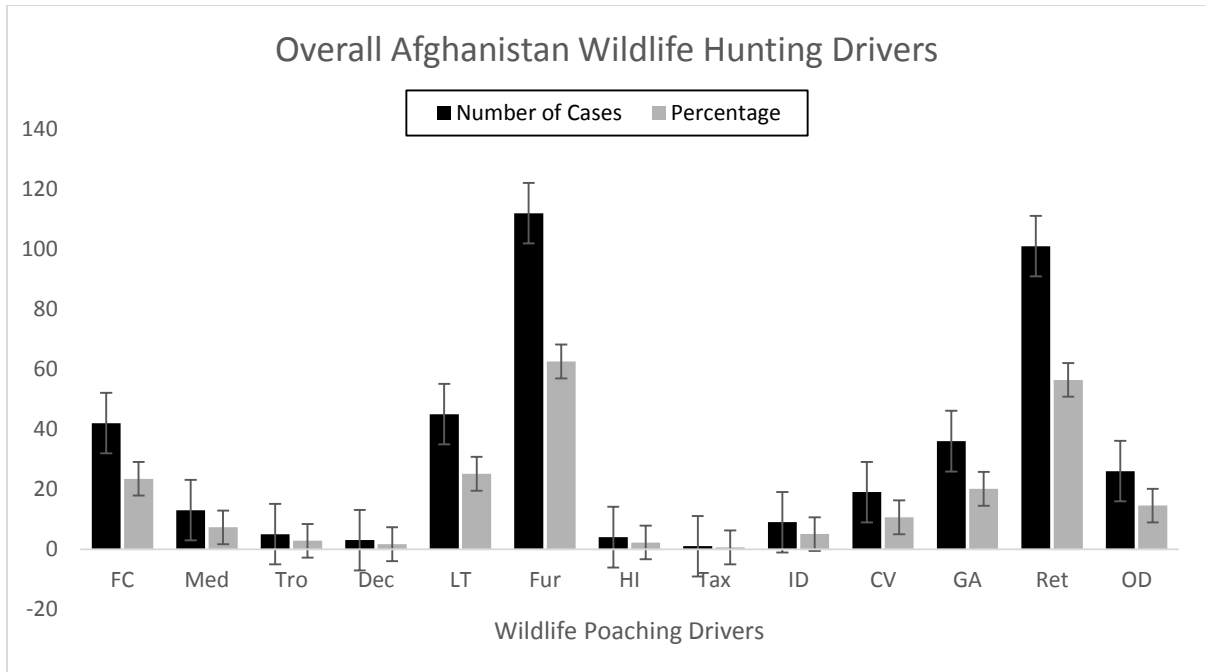


Figure 1: Results of the vote-counting meta-analysis derived from 32 studies, 179 cases, and 251 samples for overall Afghanistan poaching drivers

Note: a total case contained many subcases. Black bars (number of cases) derived from 416 subcases, grey bar (percentage) derived from 179 total cases. Percentage = number of cases*100/total cases.

FC= Family Consumption, Med = Medicinal, Tro=Trophy, Dec=Decoration, LT=Live Trade, HI= Horn and Ivory, Tax=Taxidermy, ID= International Demand, CV= Commercial Value, GA= Gun Availability, Ret=Retaliation, OD=Other Drivers

If we compare Afghanistan's poaching drivers and motivations with those of other countries in the region, such as Pakistan, Iran, and India, we can see that the main factors driving poaching for these countries are medicinal purposes (38%), followed by fur (37%), retaliation killing (37%), trophy hunting (37%), hunting for family consumption (27%), and

hunting for live trade purposes (17%) (Figure 2). However, only 7% of Afghanistan wildlife were targeted for medicinal purposes, and only 2.8% for trophy hunting (Figure 2).

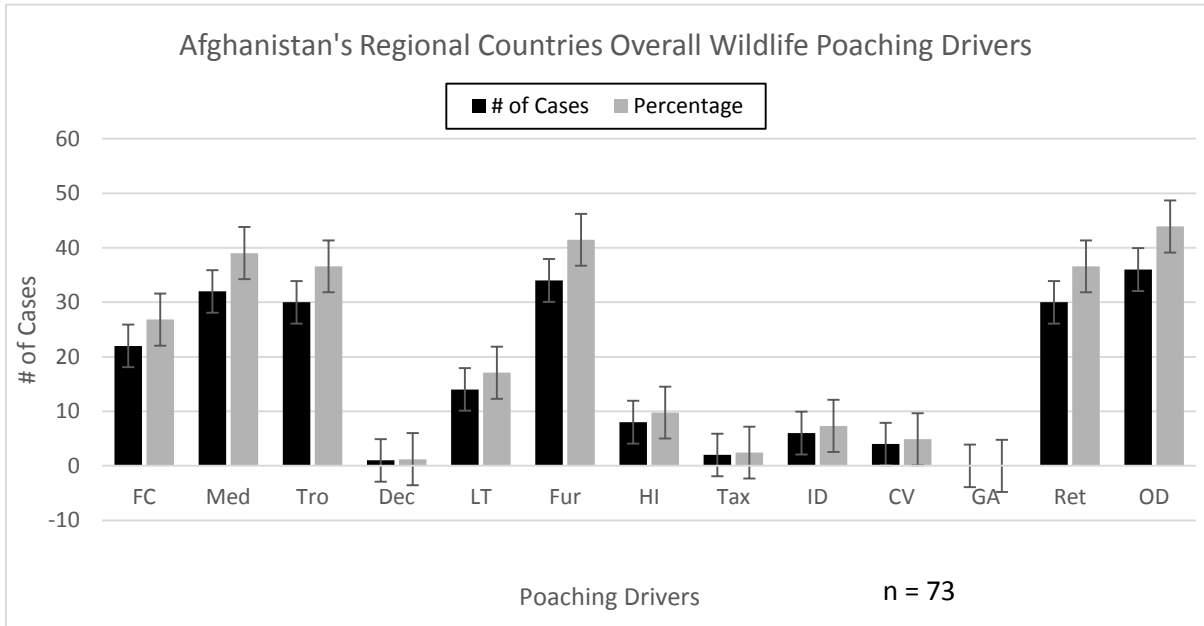


Figure 2: Wildlife poaching drivers in Afghanistan’s regional countries, based on 82 total cases and 219 subcases

Note: a total case contained many subcases. Black bars (number of cases) derived from 416 subcases, grey bar (percentage) derived from 179 total cases. Percentage = number of cases*100/total cases.

FC = Family Consumption, Med = Medicinal, Tro = Trophy, Dec = Decoration, LT = Live Trade, HI = Horn and Ivory, Tax = Taxidermy, ID = International Demand, CV = Commercial Value, GA = Gun Availability, Ret = Retaliation, OD = Other Drivers

Poaching Drivers for Afghanistan Carnivores

In this section, we analyze the motivations for poaching in Afghanistan and determine why people poach Afghanistan's carnivore species, such as snow leopards, wolves, foxes, bears, and other carnivores. Of 32 studies, 179 cases, and 252 samples, which were used in a quantitative synthesis of the meta-analysis for the Afghanistan dataset, 25 of the studies, 102 cases, and 128 samples clearly discussed poaching drivers for Afghanistan carnivore (Table 4; Appendix B for further information). The vote-counting meta-analysis results revealed that Afghanistan carnivores are significantly threatened because of the high value placed on their fur and the damage that they cause to communities' livestock. Twenty samples supported the conclusion that poaching of Afghanistan carnivores is driven by the trade in their fur (code 1), and 37 samples noted that poaching of carnivores for their fur was the most important driver (code 2), while two samples stated that Afghanistan carnivores were not poached for their fur (code 0) (Table 4). In addition, eight samples supported the conclusion that retaliation killing of Afghanistan carnivores is a driver of poaching (code 1); 42 samples mentioned that poaching for retaliation killing is the most important factor (code 2), while two samples from two studies indicated that poaching for retaliation killing was not a driver (code 0) (Table 4). Based on this analysis, poaching for fur trade (92%) and retaliation killing (90%) were the most important factors (Figure 3).

In addition to the drivers discussed above, 13% of Afghanistan wildlife are illegally taken for live trade in national and international wildlife markets as well as for zoos. The factor

of gun availability, especially in rural communities, was also reported at 5%; hunting for high commercial values was at 4%; hunting for medicinal purposes accounted for 4%, and a final 4% was accounted for by other reasons that were reported but were not highly significant. Factors such as poaching for family consumption, trophy hunting, decoration purposes, horn or ivory, taxidermy, and international demands were not mentioned by any study. Therefore, those factors can be said not to be significant poaching drivers for Afghanistan's carnivore species (Figure 3).

Table 4: Summary of results of the vote-counting meta-analysis for overall Afghanistan carnivores poaching drivers

*0 = factor is not a driver, #1 = factor is a driver, #2 = factor is the most important driver, 0+#1+#2 = total sample size for each driver, #1+#2 = Volume and magnitude of drivers

Codes →	0*	#1	#2	0+#1+#2	#1&#2
Hunting Drivers ↓					
Family Consumption	0	0	0	0	0
Medicine	0	0	2	2	4
Trophy	0	0	0	0	0
Decoration	0	0	0	0	0
Live Trade	0	1	6	7	13
Fur and Other Byproduct	2	20	37	59	94
Horn and Ivory	0	0	0	0	0
Taxidermy	0	0	0	0	0
International Demand	0	0	0	0	0
Commercial Value	0	0	2	2	4
Gun Availability	0	1	2	3	5
Retaliation	2	8	42	52	92
Other Reasons	0	2	1	3	4
Total # of Samples	4	32	92	128	

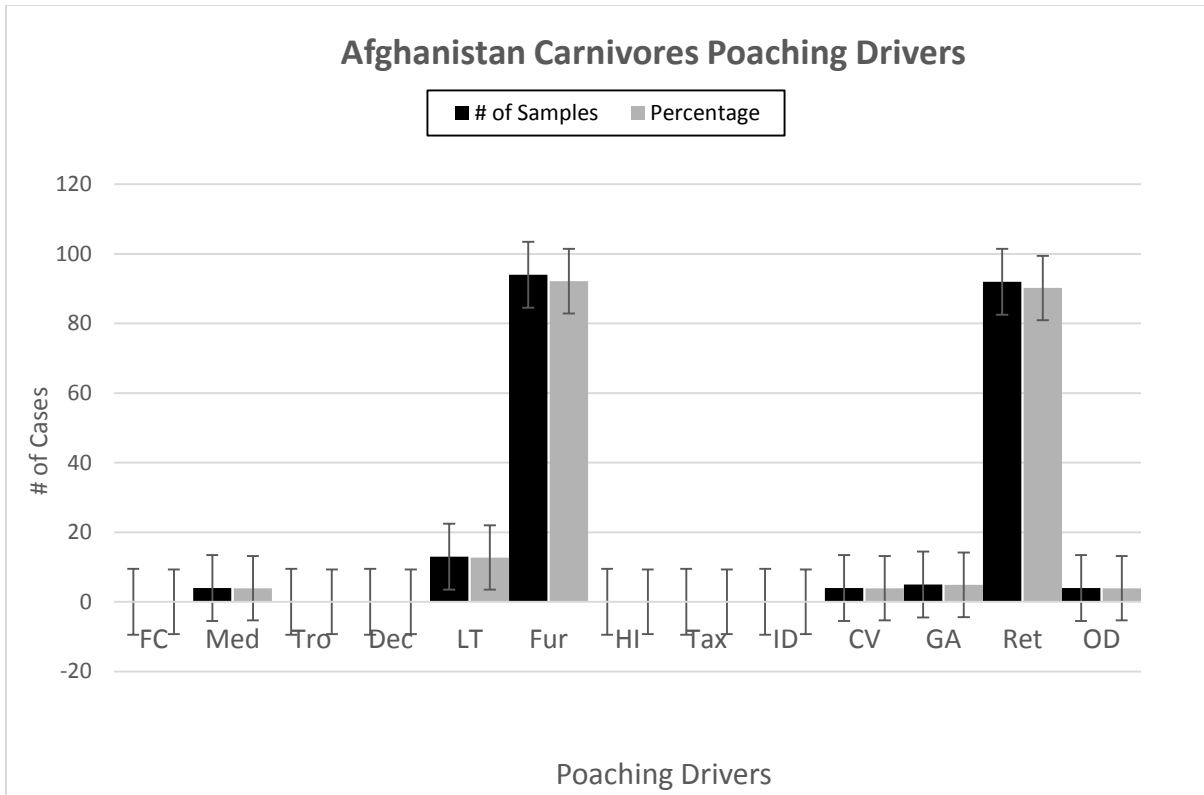


Figure 3: Afghanistan carnivores poaching drivers, derived from 102 total cases and 216 subcases.

Note: a total case contained many subcases. The black bars indicate (number of cases) derived from 216 subcases, and the grey bars indicate (percentage) derived from 102 total cases. Percentage = number of cases*100/total cases.

FC = Family Consumption, Med = Medicinal, Tro = Trophy, Dec = Decoration, LT = Live Trade, HI = Horn and Ivory, Tax = Taxidermy, ID = International Demand, CV = Commercial Value, GA = Gun Availability, Ret = Retaliation, OD = Other Drivers

Comparing the poaching drivers for Afghanistan’s carnivores with the poaching drivers for regional countries such as Iran, Pakistan, and India, we can see that the most important poaching factors for regional countries’ predators are poaching for fur trade and poaching for retaliation. Based on a systematic literature review, we selected 31 studies, which produced 82

cases and 32 samples. Of those studies, 14 studies, 29 cases, and 48 samples clearly discussed regional countries' wildlife poaching drivers.

Based on this analysis, 97% of regional countries' predators were hunted because of their valuable furs, and 66% of the predators were poached for retaliation purposes. Poaching for medicinal purposes was reported at 24%, hunting for trophies at 17%, poaching for because of high international demand was 7%, poaching for family consumption was also 7 %, and poaching for decoration purposes was reported at 3% (Figure 4). In addition, 31% of carnivores from regional countries were targeted to hunt for other reasons, such as poaching for gall bladder or other important organs.

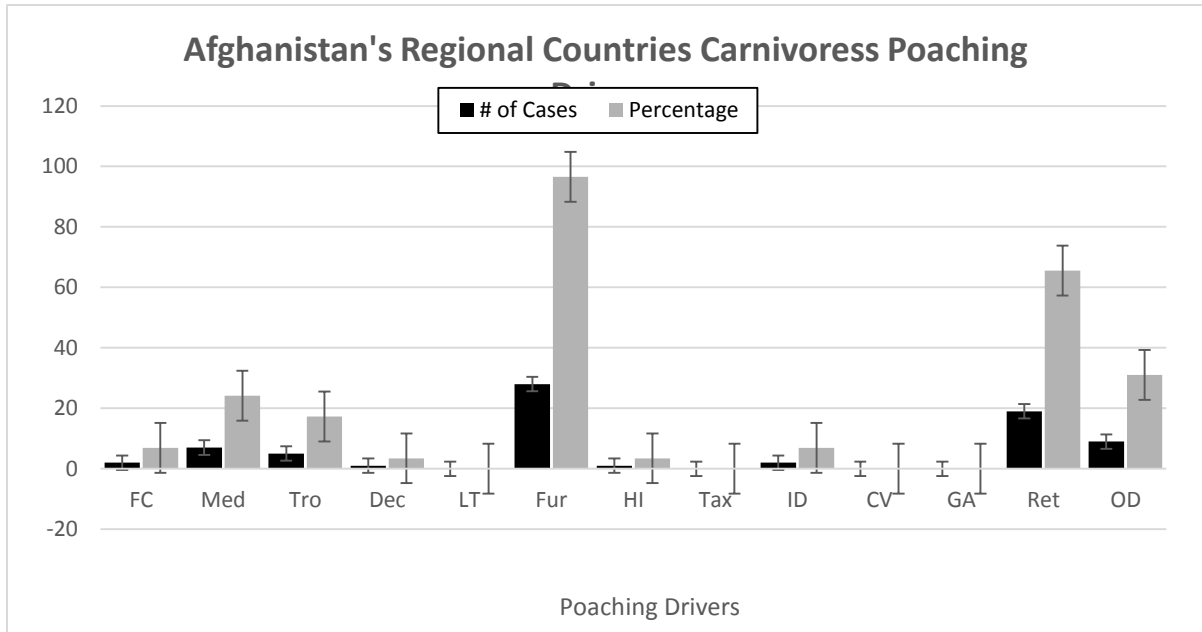


Figure 4: Poaching drivers for carnivores in Afghanistan's regional countries, derived from 29 cases and 74 subcases.

Note: a case contained many subcases. Black bars (number of cases) derived from 74 subcases, and grey bar (percentage) derived from 29 cases. Percentage = number of cases*100/total cases. In this case, since each driver can have many subcases therefore, the total percentage can be over one hundred.

FC = Family Consumption, Med = Medicinal, Tro =Trophy, Dec = Decoration, LT = Live Trade, HI = Horn and Ivory, Tax = Taxidermy, ID = International Demand, CV = Commercial Value, GA = Gun Availability, Ret = Retaliation, OD = Other Drivers

Poaching Drivers for Afghanistan Antelopes

Even-toed ungulates (*Artiodactyla*) live in different varieties of habitats. The Bovidae, such as goats, sheep, and cows (which are well known as antelopes and gazelles), is one of the families of this order (Habibi, 2003). Species of this family that can be found in Afghanistan are the Goitered Gazelle (*Gazella subgutturosa*), Siberian Ibex (*Capra ibex*), Wild Goat

(*Capra aegagrus*), Markhor, Marco Polo Sheep, Urial Sheep (*Ovis orientalis*), Bactrian Deer (*Cervus elaphus*), Musk Deer (*Moschus moschiferus*), and Wild Boar (*Sus boar*).

In performing this study, we sought to learn why people poach Afghanistan's antelopes. Based on a systematic literature review, 32 studies were selected for Afghanistan, which produced 179 cases and 251 samples. Of these studies, cases, and samples, nine studies, 20 cases, and 33 samples were tested to determine antelopes' poaching factors (Table 5; Appendix C for further information).

The majority of the studies and samples supported the hypothesis that people poach Afghanistan's antelopes for family consumption of the meat. One sample supported the conclusion that family consumption is a driver of antelope poaching (code 1), and 11 samples indicated that family consumption is the most important driver of antelopes poaching (code 2). Overall, 150% of Afghanistan antelopes were mainly hunted for this purpose (Figure 5). However, only one sample stated that Afghanistan's antelopes were not poached for family consumption (code 0) (Table 5). In addition to family consumption, one sample mentioned that poachers took antelopes in Afghanistan for their furs (code 1). Three samples (35%) mentioned that the poaching of antelopes for the fur trade was the most important factor (code 2) (Figure 5). No studies indicated that antelopes were being poached for the fur trade. Two samples mentioned that other reasons, such hunting for sport, were the main important drivers (code 2), and two samples mentioned other factors in the poaching of antelopes (code 1), which encompassed 40% of the total hunting volume (Figure 5).

The other factors, such as gun availability and commercial values of the products, comprised 20% each. Retaliation killing, the trade in horn or ivory, and the desire for decoration and trophy hunting each comprised 10% of poaching drivers. Poaching of Afghanistan antelopes for live trade accounted for only 5%, while poaching for international demand, taxidermy, and poaching for medicinal purposes were not supported by any studies, and therefore were not significant drivers (Figure 5).

Table 5: Summary of results of the vote-counting meta-analysis of poaching drivers for Afghanistan antelopes

*0=factor is not a driver, #1=factor is a driver, #2=factor is the most important driver, 0+#1+#2= total sample size for each driver, #1+#2=Volume and magnitude of drivers

Codes →	0*	#1	#2	0+#1+#2	#1&#2
Hunting Drivers ↓					
Family Consumption	1	1	11	13	23
Medicine	0	0	0	0	0
Trophy	0	0	1	1	2
Decoration	0	0	1	1	2
Live Trade	0	1	0	1	1
Fur and Other Byproduct	0	1	3	4	7
Horn and Ivory	0	0	1	1	2
Taxidermy	0	0	0	0	0
International Demand	0	0	0	0	0
Commercial Value	0	0	2	2	4
Gun Availability	0	2	1	3	4
Retaliation	0	2	0	2	2
Other Reasons	0	2	3	5	8
Total # of Samples	1	9	23	33	

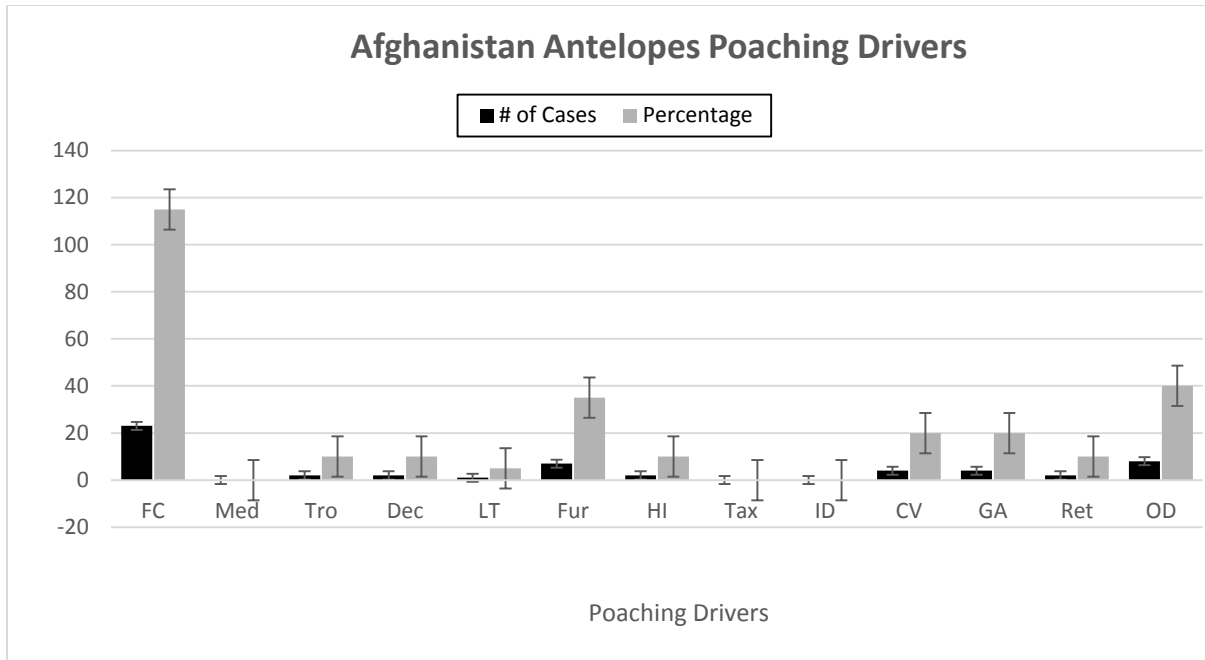


Figure 5: Poaching drivers for Afghanistan’s antelopes, which derived from 20 total cases and 55 subcases

Note: a case contained many subcases. Black bars (number of cases) derived from 74 subcases, and the grey bar (percentage) derived from 29 cases. Percentage = number of cases*100/total cases. In this case, since each driver can have many subcases therefore, the total percentage can be over hundred.
 FC = Family Consumption, Med = Medicinal, Tro = Trophy, Dec = Decoration, LT = Live Trade, HI = Horn and Ivory, Tax = Taxidermy, ID = International Demand, CV = Commercial Value, GA = Gun Availability, Ret = Retaliation, OD = Other Drivers

Comparing Afghanistan’s antelope poaching drivers with those of some other countries in the region, we can see a significant difference among the countries. Afghanistan’s antelopes were mainly hunted for family consumption, while antelopes from regional countries were mainly hunted for trophy purposes. Of the studies in the systematic literature review, 31 studies gave 82 cases, and 132 samples were selected that discussed regional countries’ wildlife

poaching motivations. Of these studies, 10 studies, 22 cases, and 33 samples clearly discussed antelope poaching drivers of other countries in the region.

The vote-counting meta-analysis for regional countries revealed that the most important poaching motivation for regional countries' antelopes was trophy hunting, 109%, which was followed by poaching for medicinal purposes (32%) (Figure 6).

In addition, 55% of Afghanistan's regional countries illegally took wildlife for other reasons, such as poaching for sport, for their valuable musk pods, and for other reasons. Other poaching drivers that were tested in this study, such as poaching for decoration, live trade, fur, taxidermy, commercial values, and impact of gun availability, were not supported by any studies, and therefore are non-significant poaching drivers (Figure 6).

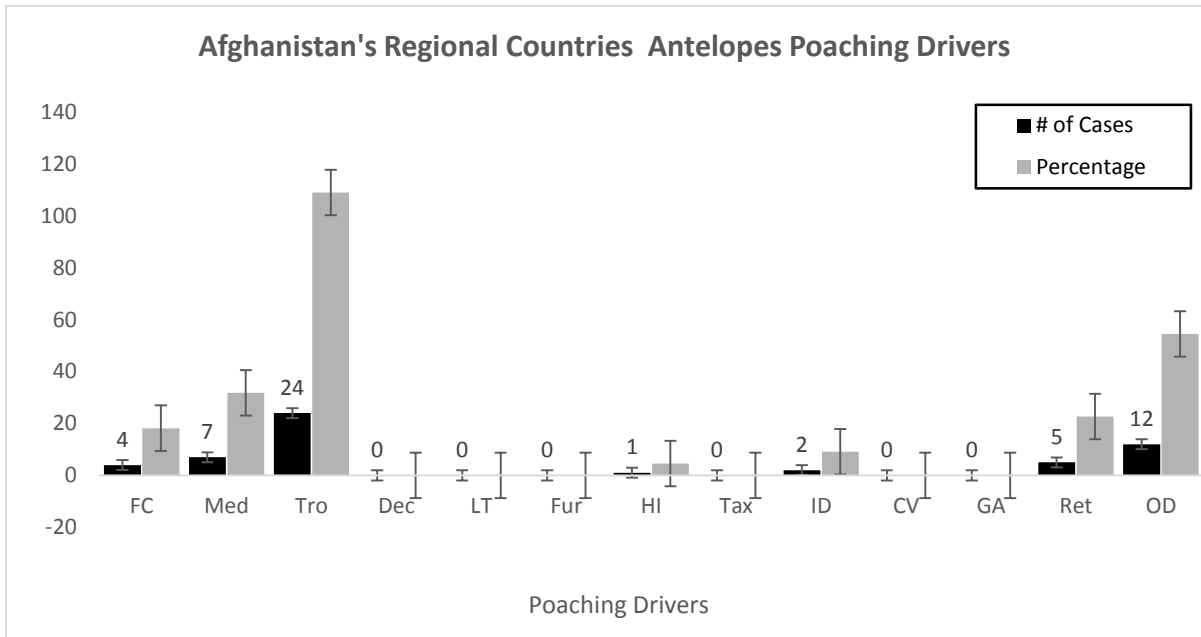


Figure 6: Antelope poaching drivers for Afghanistan’s regional countries; these are derived from 22 total cases and 55 subcases

Note: a case contained many subcases. Black bars (number of cases) derived from 74 subcases, and grey bars (percentage) derived from 29 cases. Percentage = number of cases*100/total cases. In this case, since each driver can have many subcases, the total percentage can be over one hundred.

FC = Family Consumption, Med = Medicinal, Tro = Trophy, Dec = Decoration, LT = Live Trade, HI = Horn and Ivory, Tax = Taxidermy, ID = International Demand, CV = Commercial Value, GA = Gun Availability, Ret = Retaliation, OD = Other Drivers

Poaching Drivers for Afghanistan’s Birds

In this section, we analyze why Afghanistan’s birds are targeted by poachers and consider what the main motivations may be for the poaching. Overall, 32 studies containing 179 cases and 251 samples were systematically reviewed. Of these data, 13 studies, 37 cases, and 51 samples clearly discussed poaching drivers for Afghanistan’s birds.

We found that the main factor for bird poaching in Afghanistan was live trade, followed by gun availability, family consumption, and commercial values. Two samples mentioned that live trade was a poaching driver for birds (code 1), and 13 samples mentioned that live trade was the most important driver for Afghanistan birds (code 2), which encompassed 75% total (Figure 7). We did not find any studies to support that poaching for live trade was not a driver for Afghanistan birds (code 0) (Table 6). In addition, two samples mentioned that local people's access to guns was a driver (code 1), and 9 samples claimed that gun availability was the most important driver (code 2); these drivers covered 54% (Figure 4). No studies indicated that gun availability was not a driver of poaching (code 0) (Table 6).

Poaching for family consumption and poaching for commercial value were weighted equally, comprising 24% each (Figure 7). Other factors included hunting for medicinal purposes (16%), hunting for international demand (14%), hunting for retaliation killing (5%), and hunting for fur trade (5%). In addition, 22% of Afghanistan's birds were hunted for other reasons, such as hawking and recreational purposes. However, drivers such as trophy hunting, hunting for decoration purposes, hunting for horn or ivory, and hunting for taxidermy encompassed 0% and therefore reported non-significant drivers (Figure 7).

Table 6: Summary results of the vote-counting of meta-analysis derived from 13 studies, 37 cases, and 51 samples for poaching drivers of Afghanistan's birds

*0 = factor is not a driver, #1 = factor is a driver, #2 = factor is the most important driver, 0+#1+#2 = total sample size for each driver, #1+#2 = Volume and magnitude of drivers

Codes →	0*	#1	#2	0+#1+#2	#1&#2
Hunting Drivers ↓					
Family Consumption	1	1	4	6	9
Medicine	0	0	3	3	6
Trophy	0	0	0	0	0
Decoration	0	0	0	0	0
Live Trade	0	2	13	15	28
Fur and Other Byproduct	0	0	1	1	2
Horn and Ivory	0	0	0	0	0
Taxidermy	0	0	0	0	0
International Demand	0	1	2	3	5
Commercial Value	0	1	4	5	9
Gun Availability	0	2	9	11	20
Retaliation	0	0	1	1	2
Other Reasons	0	4	2	6	8
Total # of Samples	1	11	39	51	

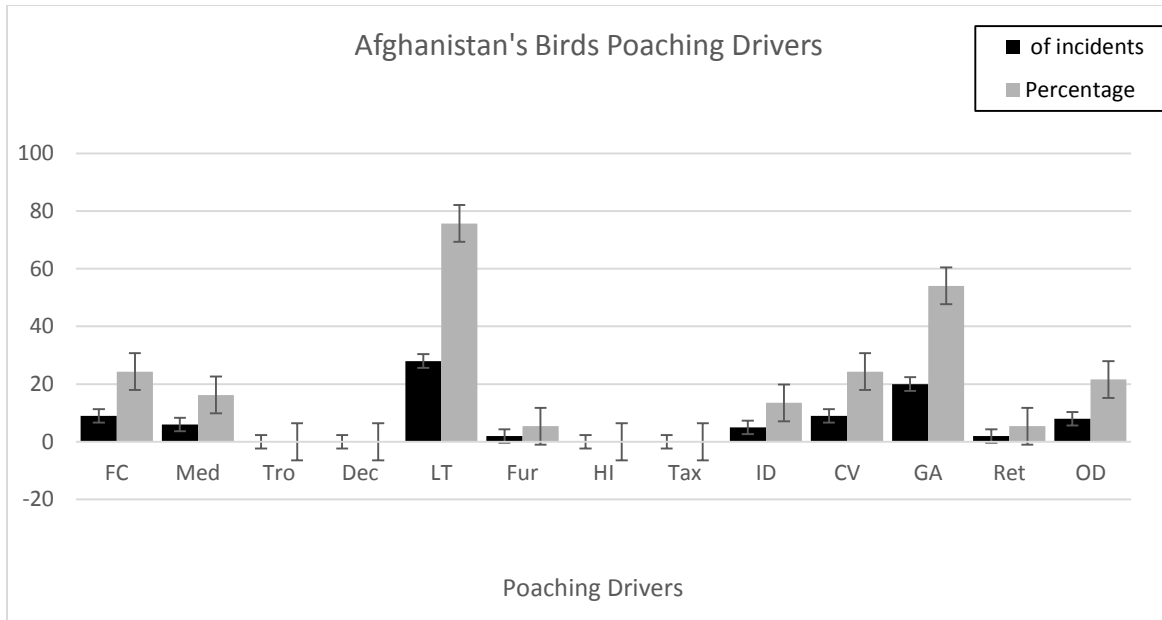


Figure 7: Poaching drivers for Afghanistan’ birds, which derived from 37 total cases and 82 subcases

Note: a case contained many subcases. Black bars (number of cases) derived from 74 subcases, and grey bar (percentage) derived from 29 cases. Percentage = number of cases*100/total cases. In this case, since each driver can have many subcases, the total percentage can be over one hundred.

FC = Family Consumption, Med = Medicinal, Tro = Trophy, Dec = Decoration, LT = Live Trade, HI = Horn and Ivory, Tax = Taxidermy, ID = International Demand, CV = Commercial Value, GA = Gun Availability, Ret = Retaliation, OD = Other Drivers

The birds of Afghanistan’s regional countries are hunted mainly for family consumption (40%), but also for commercial value (30%) and other reasons (30%) such as sport (Figure 8). In this analysis, other factors, such as the illegal taking of birds for live trade and for international demand, were reported at 20% each. Hunting for medicinal purposes, trophy hunting, decoration, fur trade, horn or ivory, taxidermy, gun availability and retaliation

killing accounted for 0% of the poaching, and therefore these factors were non-significant drivers (Figure 8).

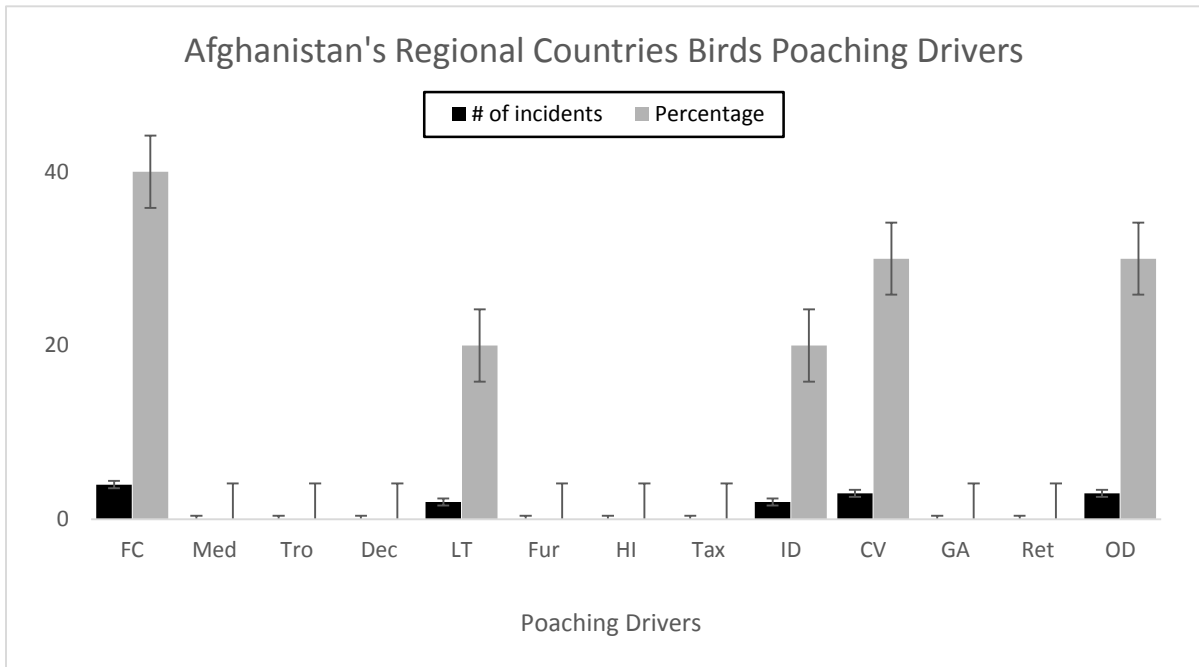


Figure 8: Birds poaching drivers in Afghanistan’ regional countries, as derived from 10 total cases and 19 subcases

Note: a case contained many subcases. Black bars (number of cases) derived from 74 subcases, and grey bars (percentage) derived from 29 cases. Percentage = number of cases*100/total cases. In this case, since each driver can have many subcases therefore, the total percentage can be over hundred.

FC = Family Consumption, Med = Medicinal, Tro = Trophy, Dec = Decoration, LT = Live Trade, HI = Horn and Ivory, Tax = Taxidermy, ID = International Demand, CV = Commercial Value, GA = Gun Availability, Ret = Retaliation, OD = Other Drivers

Poaching Drivers for Afghanistan's Other Species

The other categories of species basically consisted of two subcategories of species. This means that the "other categories" category included those species that did not fall under category 1, 2, and 3. For example, cape hare and rhesus macaque were not representative of any of the three categories. In addition, "other categories" also encompassed those wild animals that were not specified by the authors. These animals could be predators, antelopes, birds, or any other species.

Of the 32 studies, encompassing 179 cases and 251 samples, that were systematically reviewed for this study on Afghanistan poaching drivers, only 9 studies, 20 cases, and 29 samples discussed other categories of poaching drivers for species in Afghanistan.

Our results showed that the main poaching drivers for other categories in Afghanistan were poaching for family consumption followed by fur trade and gun availability. Ten samples that covered 50% (Figure 9) indicated that poaching for family consumption was the most important poaching driver (code 2). However, one sample stated that poaching for family consumption was not a driver (code 0) (Table 7; Appendix E for further details).

In addition, one sample mentioned that Afghanistan's other species categories were hunted for fur trade (code 1), as well as four samples, covering a total of 45% (Figure 9), that mentioned fur trade as the most important driver of poaching (code 2). However, two samples claimed that poaching for fur was not an important driver of other categories of poaching in

Afghanistan (code 0) (Table 7). Poaching as result of gun availability covered 30%, while medicinal purposes, trophy hunting, live trade, and retaliation killing comprised 15% each. Other factors, such as poaching because of high international demand and poaching for other reasons, covered 10% each. Poaching for horn or ivory and poaching for taxidermy accounted for five percent each, and poaching for commercial value and for decoration purposes covered 0% (Figure 9).

Table 7: Summary results of the vote-counting of meta-analysis from 9 studies, 20 cases, and 30 samples for “other categories” of poaching drivers for Afghanistan’s species

*0 = factor is not a driver, #1 = factor is a driver, #2 = factor is the most important driver, 0+#1+#2= total sample size for each driver, #1+#2=Volume and magnitude of drivers

Codes →	0	#1	#2	0+#1+#2	#1&#2
Hunting Drivers ↓					
Family Consumption	1	0	5	6	10
Medicine	0	1	1	2	3
Trophy	0	3	0	3	3
Decoration	0	0	0	0	0
Live Trade	0	1	1	2	3
Fur and Other Byproduct	2	1	4	7	9
Horn and Ivory	0	1	0	1	1
Taxidermy	0	1	0	1	1
International Demand	0	0	1	1	2
Commercial Value	0	0	0	0	0
Gun Availability	0	0	3	3	6
Retaliation	0	3	0	3	3
Other Reasons	0	0	1	1	2
Total # of Samples	3	11	16	30	

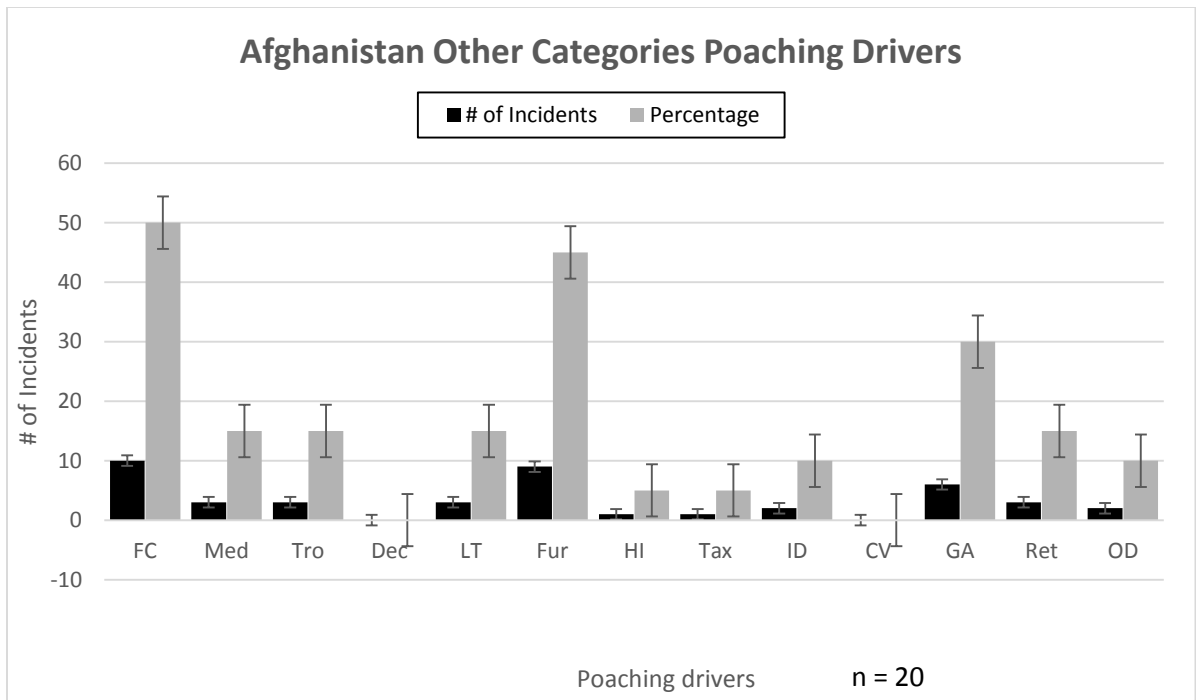


Figure 9: Afghanistan’s “other categories” poaching drivers, which derived from 20 total cases and 43 subcases

Note: a case contained many subcases. Black bars (number of cases) derived from 74 subcases, and grey bars (percentages) derived from 29 cases. Percentage = number of cases*100/total cases. In this case, since each driver can have many subcases, the total percentage can be over one hundred.

FC = Family Consumption, Med = Medicinal, Tro = Trophy, Dec = Decoration, LT = Live Trade, HI = Horn and Ivory, Tax = Taxidermy, ID = International Demand, CV = Commercial Value, GA = Gun Availability, Ret = Retaliation, OD = Other Drivers

Comparing Afghanistan’s “other categories” with those of regional countries, we found that for the regional countries most of the wild species in this category were mainly poached for medicinal purposes (91%), followed by family consumption (57%) and live trade (48%) (Figure 10). However, Afghanistan’s “other categories” species were mainly poached for family consumption (50%) and fur trade (45%).

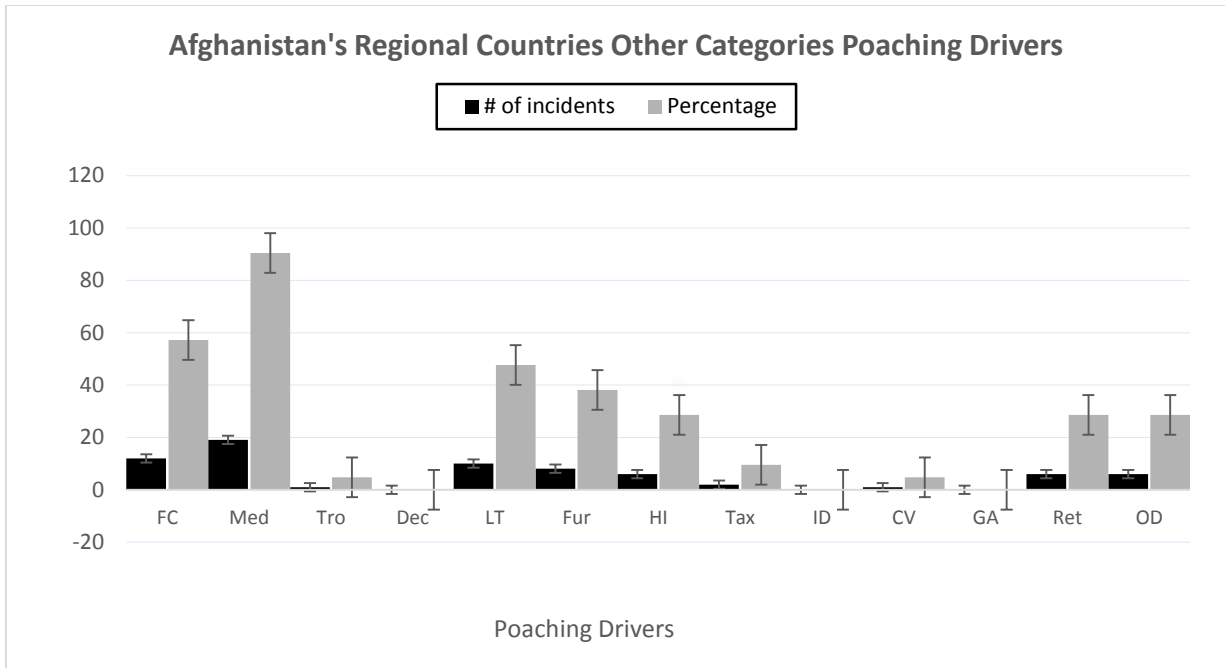


Figure 10: Afghanistan regional countries “other categories” of poaching drivers, derived from 21 total cases and 74 subcases

Note: a case contained many subcases. Black bars (number of cases) derived from 74 subcases, and grey bars (percentage) derived from 29 cases. Percentage = number of cases*100/total cases. In this case, since each driver can have many subcases, the total percentage can be over one hundred.

FC = Family Consumption, Med = Medicinal, Tro = Trophy, Dec = Decoration, LT = Live Trade, HI = Horn and Ivory, Tax = Taxidermy, ID = International Demand, CV = Commercial Value, GA = Gun Availability, Ret = Retaliation, OD = Other Drivers

Tracking and Protection of Afghanistan’s Illegal Wildlife Markets

In this section, we address our second research question through the findings of our meta-analysis study. We explain how the illegal wildlife market functions in Afghanistan and draw the Afghanistan wildlife market flow and protection opportunities.

In Kabul, the capital of Afghanistan, two main markets provide different wild species and products. These markets are locally known as Ka Farushi and the Chicken Street market. Determining and understanding the function of these markets is critically important if we are to break the illegal market chain and support conservation policies.

Transporting from villages to national markets

There are few studies in Afghanistan that track wildlife poaching; however, different surveys and reports have stated that wildlife and its byproducts are collected from villages and remote areas and transported to province markets. Johnson and Wingard (2010) are the only authors to analyze the Afghanistan wildlife trade chain. They found that Afghanistan wild species could be exported to national and international markets through four different chains.

Our study is mainly based on a systematic literature reviews, however. As discussed in this chapter, we performed a systematic literature review on 251 articles and studies, using as our primary source Afghanistan's environmental laws and regulations.

Based on the systematic literature review, we found that, in general, wild species are hunted in their natural habitats by local people and then sold to peddlers. Peddlers take products to the regional markets or Kabul markets. For example, Habibi (2003) reported that people hunted marmots (*Marmota* spp) in Pamir of Badakhshan and then sold them to peddlers. The peddlers then exported the marmots to a provincial market (Badakhshan market), and from the provincial market, the marmots were exported to Kabul fur markets. Sayer and Van der Zon

(1981) found that small animals such cats, otters (*Lutra lutra*), martens (*Martes foina*) and other similar small animals were hunted by hunters in villages and sold to the venders in bigger towns, which were then transported to Kabul markets, where the main center for wildlife products are open to public. Snow leopard furs were reported as coming from Badakhshan and Nuristan provinces and sold in the Chicken Street market. The venders openly and without any risk of arrest showed wildlife products to their customers (Simms et al, 2011). These studies suggested that furs and other byproducts were collected from different regions and then sent to Kabul markets where venders openly sold to national and international customers.

Because of Afghanistan's weak governance of its natural resources and its highly functioning illegal wildlife market, Afghanistan seems to be one of the most secure places in the world for international illegal wildlife trade. For instance, different birds of foreign origin could be distinguished in Kabul's Ka Farushi market, such as the red collared dove (*Streptopelia tranquebarica*), gray francolin (*francolinus pondicerians*), and white-eared bulbul (*Pycnonotus leucotus*), which according to shopkeepers were imported from Pakistan or India (Ostrowski, 2007). In addition, the interviews with shopkeepers revealed that canaries, which are expensive in Afghanistan, are imported from Iran, Germany, or Poland for a relatively low cost. It is worth noting that, even though some birds were determined to be of foreign origin, the fact that they were sold at lower prices (\$5–\$10) in Kabul markets indicates that those birds were not imported from other countries at all. The author assumes that they were captured by hunters within the country as winter visitors.

Transporting of wildlife or wildlife products from Afghanistan to neighboring counties and overseas

Afghanistan's wildlife is illegally hunted not only to satisfy local consumption, but also because of international demand. Afghanistan's valuable wildlife byproducts, such as furs, are exported not only to its neighboring countries, particularly Pakistan and Iran, but also to overseas countries. According to Habibi (2003), poachers heavily hunted red fox (*Vulpes vulpes*), Himalayan lynx (*Lynx lynx isabellina*), otter, stone marten, and other species that have high fur value and then sold these animals in Pakistan markets. Afghanistan shares 2430 km of border with Pakistan, and this long, uncontrolled border makes Afghanistan's conservation efforts all but futile. Poachers are able to cross the border without any serious restrictions, and this fact might encourage poachers to maximize the benefit of each crossing. Interviews have shown that falcons have been trapped and then sold to Pakistani traders (Moheb & Mostafawi, 2011). Most of Afghanistan's birds, especially fighting birds, are exported to Saudi Arabia and the United Arab Emirates. Arabs have a long history of capturing and pursuing falconry. One case study revealed that falcons and other raptors are captured by Afghan poachers and sold as Arabian falconry (Adil, 2001).

Recent studies did not focus much on exporting of Afghanistan wildlife species or their shipment to European countries; however, studies in the 1980s claimed that some of the valuable birds, such as the Dalmatian pelican (*Pelecanus erispus*), white-tailed eagle (*Haliaeetus albicilla*), and peregrine falcon (*Falcon pelegrinoide babylonicus*.) were exported from Afghanistan to western Europe and Arabian countries (Sayer & Van der Zon, 1981).

The United States also plays a role in the exporting of Afghanistan's wildlife products. A recent study revealed that U.S. military personnel significantly increased the purchasing power of Afghanistan's wildlife products (Kretser et al, 2012).

Afghanistan supply chain mapping

As confirmed by previous findings, Afghanistan wildlife is subject to poaching and illegally transported to national and international markets. Because Afghanistan's rich biodiversity resources are in remote areas, transportation is difficult and expensive. Usually, wildlife is illegally hunted by villagers and then sold to peddlers who transport it into the provincial markets. Traders at the provincial level directly smuggle the products to foreign countries or send them to Kabul markets for their own vendors. Foreigners who work for international companies and non-governmental organizations (NGOs), as well as some rich Afghan people, often visit Chicken Street market and sometimes Bird market, which is known as Ka Fraushi, to purchase wildlife products. Vendors also encourage the foreign shoppers by showing them different kinds of skins, ivories, and other products without any risk of arrest. Afghanistan's supply chain, or market flow, is summarized in the following diagram.

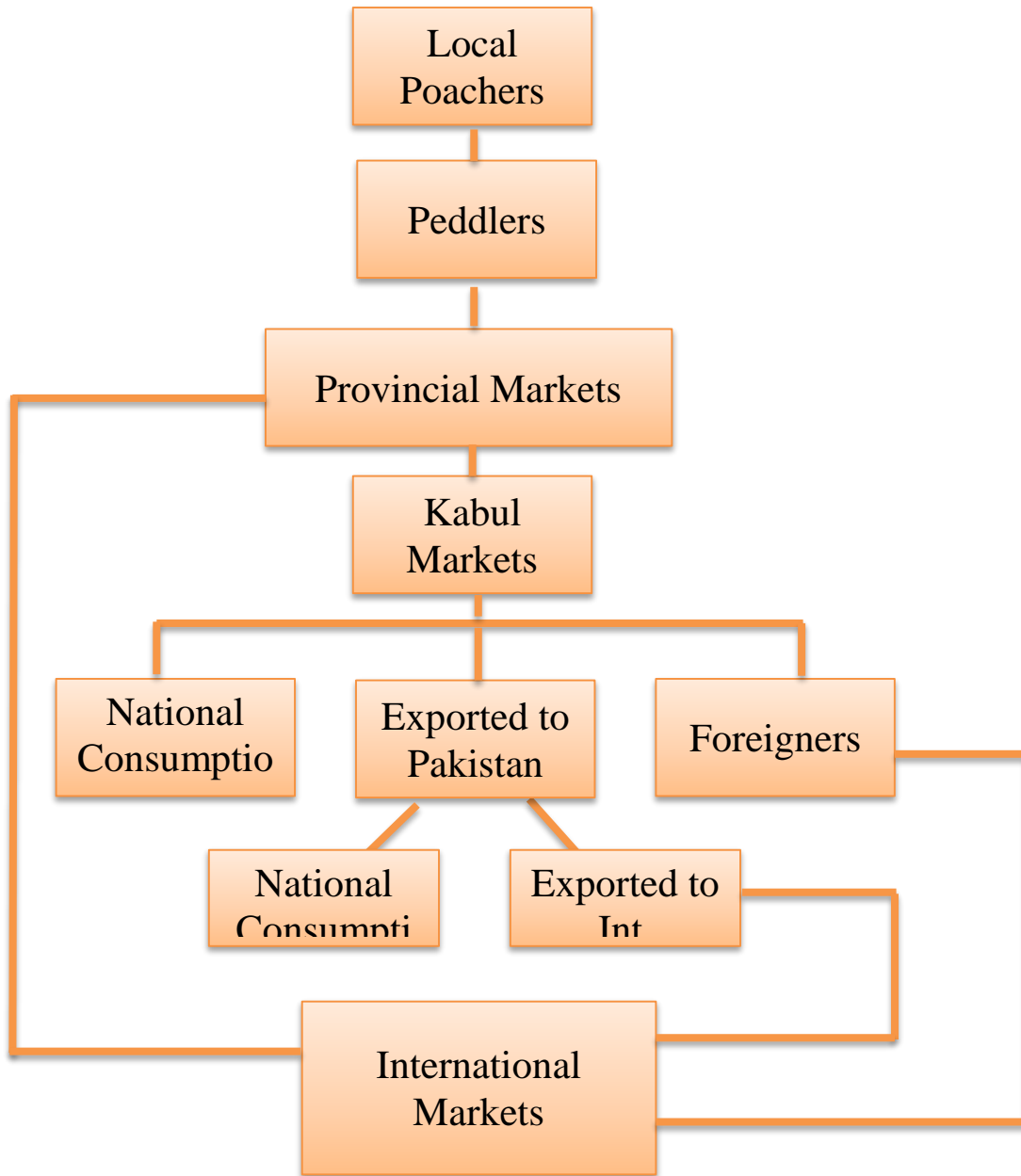


Figure 11: Afghanistan wildlife and its product supply chain from producers to consumers.

Local poachers take valuable wildlife and sell to peddlers and peddlers, who sell the goods for a higher price in provincial markets. Provincial traders either directly export wildlife to international markets or send their product to Kabul. In the Kabul market, many rich Afghans or those foreigners who are serving in Afghanistan buy these products; or, traders send the products to Pakistan markets. In Pakistan, again, rich Pakistanis who have an interest in wildlife products might buy them or export them from Pakistan to international markets. Each step of the market chain would add a value onto the product, and the price goes up all the way to the end of the chain.

Discussion

The aim of this analysis was to determine the motivations for wildlife poaching in Afghanistan as well as to map the illegal wildlife markets. In addition, we reviewed some of the articles from the regional countries such as Pakistan, Iran, and India in order to establish benchmarks to compare with our findings from Afghanistan. Overall, we found that Afghanistan's wildlife is significantly threatened by fur trade and retaliation killing. However, wildlife from regional countries is more targeted to hunt for fur, and for medicinal and other reasons. We further discuss motivations for hunting carnivores, antelopes, and birds in Afghanistan and regional countries and compare why the differences exist.

Motivation for Poaching Carnivores: Our study results revealed that the significant poaching drivers for Afghanistan carnivore species are fur trade and retaliation killing. However, Afghanistan regional countries' carnivores are mainly poached for medicinal purposes, followed by fur, retaliation killing, trophy hunting, hunting for family consumption, and hunting for live trade purposes.

The only significant differences between Afghanistan and the regional countries' poaching drivers for predators were trophy poaching and medicinal purposes. The big difference in the case of trophy hunting could be attributable to Afghanistan's insecurity situation. Since the 1970s, especially during Afghanistan's civil war, no trophy hunting programs were supported by regulatory organizations, and also, trophy hunters did not come to Afghanistan as a result of wars. Recent studies did not support trophy poaching in Afghanistan. For example, Johnson and Wingard (2010) conducted surveys that revealed that most of the respondents had refused any trophy poaching activities or incidents in Afghanistan in recent years.

In the case of medicinal usage, the big difference lies in the influence of the Chinese medicinal sector on the regional countries, especially India and Pakistan. Our systematic literature review does not support Afghanistan wildlife poaching for the purpose of medicinal demand in Chinese markets. However, TRAFFIC (1998) disclosed an active medicinal trade of Siberian Tiger (*Panthera tigris altaica*), Siberian Elk (*Cervus spp*), Brown Bear, Saiga antelope (*Saiga tatarica*), Siberian Musk Deer (*Moschus mosciferus*), and other species from regional countries to China and other Asian countries.

Fur trade and retaliation killing of wildlife are significant poaching drivers for Afghanistan and also for regional countries; these drivers accounted for a significant proportion of poaching activity. Because Afghanistan mostly depends on agriculture and animal husbandry, the retaliation killing of wildlife in Afghanistan is mainly because of the Afghans' dependence on their livestock industries and agriculture practices. The same dependency could also exist in regional countries, particularly in Pakistan and Iran.

Motivations for Poaching Antelopes: Because our meta-analysis results show that Afghanistan's antelopes are mainly hunted for family consumption (meat), we concluded that antelopes were a highly important source of food. By contrast, regional countries' antelopes are mainly hunted for trophy purposes.

The significant difference between Afghanistan and the regional countries could be that in recent years, all of Afghanistan's wild species came under the strict protection of the government, and there is no organized hunting program such as trophy hunting. Presidential decree No. 53, issued in 2005, required banning wildlife hunting in Afghanistan. After this ordinance, all hunting of wild species was considered illegal; therefore, there was no longer any legitimate reason for hunting in Afghanistan.

Nevertheless, regional countries, especially Pakistan, have organized trophy-hunting programs for national and international hunters. For instance, the National Council for Conservation of Wildlife (NCCW) and the International Union for Conservation of Nature (IUCN) of Pakistan provide facilities and ease the documentation process for trophy hunting blue sheep (Qureshi et al, 2011).

Beside in Pakistan, organized hunting or trophy hunting was also a real practice in the Commonwealths of Independent State (CIS) countries. Reports have stated that many trophy hunters from Western Europe, North America, and other regions of the world were coming to Russia and other CIS countries to hunt wild sheep and goats, even though some of these species are rare or threatened (TRAFFIC, 1998)

Motivations for Bird Poaching: Birds, like other wildlife, are also not safe from poachers in Afghanistan. Our study showed that the main hunting drivers for birds were live trade, gun availability, and family consumption. However, birds in regional countries were mainly targeted for other reasons; first sport, followed by family consumption and commercial values.

The significant difference between bird poaching drivers in Afghanistan versus regional countries was gun availability. The gun availability driver, which was reported to be a non-significant driver in regional countries, was a significant driver for Afghanistan's bird poaching. This difference can be explained by the three decades of civil wars in Afghanistan. Once Russian troops attacked Afghanistan in 1979 and the long civil war began, most people, particularly those living in rural areas, gained access to guns. Guns were distributed throughout Afghanistan for fighting Russian troops, and many of these guns remain in use now. Regional countries, like Iran, also experienced a foreign war (the Iran–Iraq war) from 1980 to 1988 and fought for almost 10 years (Takeyh, 2010), but Afghanistan's 1979 war had different consequences than the Iran–Iraq 1980 war. That is, once the Iran–Iraq war finished, the

situation there turned back to normal. In Afghanistan, however, the ending of the Russian attack led immediately into a long civil war.

Conclusion

We found that the most important motivations for poaching Afghanistan's species were fur trade and retaliation killing. These motivations were also the dominant motivations for poaching Afghanistan's carnivore species. However, Afghanistan's antelopes were mainly hunted for family consumption (meat), and birds were mostly hunted for live trade. The most important poaching drivers for other categories of species that do not fall under these three categories were family consumption, fur trade, and gun availability.

Overall, our review of poaching drivers in the other regional countries around Afghanistan confirmed that regional countries' wildlife are mainly hunted for the fur trade, medicinal purposes, retaliation killing, and trophy hunting. Our study based on species type for regional countries confirmed that carnivores are significantly threatened due to their valuable furs and other byproducts, and due to the trend of retaliation killing. Meanwhile, antelopes are hunted for trophy purposes, and birds are hunted for family consumption and for other reasons such as pleasure.

The illegal wildlife markets in Afghanistan also play a significant role in the illegal hunting of wildlife. The two important wildlife markets, namely Birds Market (Ka Farushi) and Chicken Street Market, openly offer different wild species and their byproducts.

These markets directly or indirectly foster poachers. Poachers either directly bring their own product to the markets or sell to peddlers, and peddlers bring the product to the markets and sell at higher prices. In addition to local and national markets, Afghanistan wildlife and their byproducts are exported to neighboring, regional, and overseas markets.

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APPENDICES

Appendix A: Results of the vote counting meta-analysis derived from 32 studies, 179 cases and 251 samples for overall Afghanistan poaching drivers

Poaching Drivers	Family Consumption			Medicine			Trophy			Decorati-on			Live Trade			Fur			Horn			Taxidermy			Internation-al Demand			Commerci-al Value			Gun Availability			Retaliation			Other Reasons																	
	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2																		
Codes →	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2																		
Authors ↓																																																						
Kretser et al, 2012		1	2		1	1		1	1				1	2			1	2		1	1		1	1		1	2																											
Abdul, 1997													1	2			1	2																																				
Moheb & Mustafawi, 2011	1		1										1	3	7		1	2		1	2					1	2						1	2	7																			
Formoli, 1995				1	2											2	4									1	2		3	2	7																							
Ostrowski et al, 2008a		3	6						1	2			2	4		2	4									1	2			5	10		2	2																				
Moheb et al, 2012				1	2											1	2									1	2		1	2																								
Moheb & Mustafawi, 2012		1	2		2	4							3	6		3	6		1	1						1	1	3	1	3	7																							
Ostrowski et al, 2007 a		1	2										2	4	10	1	2							2	4		4	8		4	8		2	4		2	4																	
Ostrowski, 2008b													1	2												1	2																											
Ostrowski, 2007													1	2											1	1																												
Mock et al, 2007								1	1																																													
Habib, 2008																											1	2		2	4																							
Aye, 2007																							1	1																														
Ostrowski, 2006				1	2																													1	1																			
Simms et al, 2011												1	2			1	2														1	2																						
Habib, 2007																	2	4														2	4																					
Ali & Simms, id																															2	4																						
Ostrowski, 2007																															2	4																						
Karlstetter, 2008		2	4					1	1							1	2	5						1	2		1	2	1	5	7	19																						
UNEP, 2009																1	1									1	1																											
UNEP, 2003a		3	6									1	2		6	4	14								1	2	5	1	2	4	1	1						1																
UNEP, 2003b		1	2									1	1												2	4			2	4																								
Adil, 2001												1	2		4	4									1	1																												
MAIL, 2009		1	2																							1	2										1	2																
NEPA, 2001																														1	1																							
Habibi, 2003	1	1	2		1	2						1	1	4	1	13	27								1	1	2	1	1	1	2	5					1	2																
Sayer & Van de Zon, 1981		2	4					1	2			1	2		1	2	5											1	3	7					1	2																		
Moheb & Mustafawi, 2013	2											1	2			1	2													5	10																							
Schaller, 2007																														1	1																							
Hassinger, 1973																3	3													1	2																							
Sieff, 2013				2	4												1	2																	3	3																		
Johnson & Wingard, 2010	1	2	5					1				1	1			5	7	19												1	2	5					1	4	9															
Total # of Samples	3	2	20	42	0	1	6	13	1	3	1	5	0	1	1	3	0	5	20	45	4	22	45	112	0	2	1	4	0	1	0	1	0	1	0	1	3	4	1	1	9	19	0	6	15	36	2	13	44	101	0	8	9	26
Total # of Studies	2	2	12	13	0	1	5	6	1	3	1	4	0	1	1	2	0	4	12	14	1	8	17	20	0	2	1	3	0	1	0	1	0	1	0	1	3	4	1	1	5	6	0	6	10	13	2	7	17	19	0	5	5	9

Appendix B: Results of the vote counting meta-analysis derived from 25 studies, 102 cases and 128 samples for Afghanistan carnivore poaching drivers

Poaching Drivers →	Family Consumption				Medicine			Throphy			Decoration			Live Trade				Fur				Horn/Ivory				Taxidermy				International Demand				Commercial Value				Gun Availability				Retaliation				Other Reasons							
	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2									
Codes →	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2	
Authors ↓																																																					
Abdul, 1997																																																					
Moheb & Mustafawi, 2011																																																					
Formoli, 1995																																																					
Ostrowski et al, 2008a																																																					
Moheb et al, 2012																																																					
Moheb & Mustafawi, 2012																																																					
Ostrowski et al, 2008b																																																					
Habib, 2008																																																					
Simms et al, 2011																																																					
Habib, 2007																																																					
Ali & Simms, id																																																					
Ostrowski, 2007																																																					
Karlstetter, 2008																																																					
UNEP, 2009																																																					
UNEP, 2003a																																																					
UNEP, 2003b																																																					
Adil, 2002																																																					
NEPA, 2011																																																					
Habibi, 2003																																																					
Sayer & Van de Zon, 1981																																																					
Moheb + Mustafawi, 2013																																																					
Schaller, 2007																																																					
Hassinger, 1973																																																					
Sieff, 2013																																																					
Johnson & Wingard, 2010																																																					
Total # of Samples	0	1	2	0	0	1	4	4	0	1	2	0	0	1	2	0	0	2	8	13	2	21	39	94	0	1	2	0	0	1	2	0	0	1	2	0	0	0	1	4	4	0	2	4	5	2	9	44	94	0	3	3	4
Total # of Studies	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	1	4	5	1	8	15	18	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	2	3	2	4	17	19	0	2	1	3			

Appendix D: Results of the vote counting of meta-analysis derived from 13 studies, 37 cases and 51 samples for Afghanistan’s Birds poaching drivers

Afghanistan's Birds Poaching Drivers																																																						
Poaching Drivers	Family Consumption				Medicine			Trophy			Decoration			Live Trade			Fur			Horn/Ivory			Taxidermy			international demand			Commercial value			Gun availability			Retaliation			Other Reasons																
	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2														
Indicators	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2										
Authors																																																						
Moheb & Mustafawi, 2011		1		1											3	6																			1	2			1	2														
Formoli, 1995						1	2											1	2																																			
Ostrowski <i>et al.</i> 2008a			2	4											1	2																			1	2							2	2										
Moheb & Mustafawi, 2012			1	2			1	2							2	4																			1	2																		
Ostrowski <i>et al.</i> 2007a			1	2											2	2	4											2	4			2	4			4	8							2	4									
Ostrowski, 2007															1	2															1	1																						
Aye, 2007																											1	1																										
Ostrowski, 2006							1	2																															1	1														
UNEP, 2009															1	2															2	4			1	1	3																	
Adil, 2002															1	2																			1	1																		
Sayer & Van de Zon, 2006															1	2																																						
Moheb & Mustafawi, 2013		1													1	2																																						
Johnson & Wingard, 2010																																			1	2							1	1										
Total # of Samples	1	1	4	9	0	0	3	6	0	0	0	0	0	0	0	0	0	0	2	13	26	0	0	1	2	0	0	0	0	0	0	0	0	0	0	1	2	5	0	1	4	9	0	2	9	20	0	0	1	2	0	4	2	8
Total # of Studies	1	1	3	4	0	0	3	3	0	0	0	0	0	0	0	0	0	0	1	9	9	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	1	2	0	1	2	3	0	2	6	7	0	0	1	1	0	3	1	4

Appendix E: Results of the vote counting of meta- analysis from 9 studies, 20 cases and 30 samples for Afghanistan’s ‘other categories’ species poaching drivers

Afghanistan Others Categories' Species Poaching Drivers																																																				
Poaching Drivers	Family Consumption				Medicine			Trophy			Decoration			Live Trade			Fur			Horn/Ivory			Taxidermy			International Demand			Commercial Values			Gun Availability			Retaliation			Others Reasons														
Indicators	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2	0	1	2	1+2								
Authors																																																				
Kretser et al, 2012			1	2	1		1		1		1						1		2		1		2		1		1		1		1		1		2																	
Moheb & Mustafawi, 2011																																											3	3								
Mock et al, 2007									1		1																																									
Karlstetter, 2012			1	2					1		1																																1	2								
UNEP, 2003			1	2																																			1	2												
MAIL, 2009			1	2																															1	2																
Habibi, 2003	1				1		2						1		1	2	2		4																																	
Sayer & Van de Zon, 1982			1	2													1		2																																	
Johnson & Wingard,																	1		1																																	
Total # of Samples	1	0	5	10	0	1	1	3	0	3	0	3	0	0	0	0	0	1	1	3	2	1	4	9	0	1	0	1	0	1	0	1	0	0	1	2	0	0	0	0	0	0	3	6	0	3	0	3	0	0	1	2
Total # of Studies	1	0	5	5	0	1	1	2	0	3	0	3	0	0	0	0	0	1	1	2	1	1	3	4	0	1	0	1	0	1	0	1	0	0	1	1	0	0	0	0	0	0	3	3	0	1	0	1	0	0	1	1

CHAPTER 3

Afghanistan Wildlife Hunting Market Survey and Study

Introduction

A given society's motivations for poaching, or illegal hunting of wildlife, depend on its social, cultural, religious, and economic characteristics. For instance, greater cane rat is targeted by hunters for their meat and is considered one of the most valuable game species in tropical Africa (Den Hartog & De Vos, 1973). However, this species has never been hunted for meat purposes in Afghanistan and is culturally considered to be a "trash" species. Because the drivers of wildlife poaching are different from country to country, understanding poaching drivers and motivations in the Afghanistan context is critically important from a policy and management perspective.

In this study, our specific objectives are to address (1) what are the main poaching motivations and drivers for Afghanistan wildlife? and (2) How does Afghanistan's illegal wildlife market function, and how is it fostered? To date, these two important questions have not been widely studied and reported upon. To address these questions, we conducted a survey of hunters, community residences of the two national parks (Band-e-Amir National Park and Wakhan National Park), wildlife markets vendors, and participants who had scientific training, professional experience, or were otherwise familiar with wildlife management, hunting, and conservation in Afghanistan. Our goal was to find out the condition of Afghanistan's wildlife,

the intensity of hunting there, and people's behavior regarding wildlife conservation, management, hunting, and the functioning of illegal wildlife markets.

In this research, we explored the magnitude of poaching drivers such as family consumption; medicinal needs; the trade in fur, horns, and other byproducts; retaliation; pet and live trade; high demand in international markets; high demand among of foreigners who live and work in Afghanistan; foreign trophy hunters; and national trophy hunters. We also explained which poaching drivers were the most and least important. Next, we statistically tested whether poaching drivers, education levels, and hunting intensity were associated with people's perceptions of wildlife conditions. This meant investigating whether people's perceptions of wildlife conditions varied based on education level, hunting intensity, and poaching drivers (for education levels, hunting intensity and poaching drivers, refer to appendix A). Moreover, we determined how poaching drivers defined hunting intensity, specifically, whether poaching drivers increased or decreased hunting intensity in the study area. Understanding of all these factors is very important for Afghan policymakers and wildlife conservation agencies.

Method

Materials, participants, and study area: We developed a questionnaire (see Appendix A), consent letter (see Appendix B), and research ethics agreement between the author and field surveyor (see Appendix C) to be completed by hunters, shopkeeper in wildlife markets, and communities' residents. These participants all had scientific background, professional experience, or were otherwise familiar with wildlife management, hunting, and conservation in Afghanistan, as well as about hunting intensity, magnitude, and drivers of wildlife hunting and its markets on the national and international levels.

All survey material, including the questionnaire, consent letter, and ethics agreement form were first reviewed and approved by the NC State University Institutional Review Board for the use of Human Subjects in Research, as outlined in the Code of Federal Regulations (Exemption 46.101.b.2). All these materials were written in English and then translated to Dari (Afghanistan's national language) by the author. To test the accuracy of the translation, back-translation techniques were used (Brislin, 1970). The translated versions were sent to a bilingual translator to translate back from Dari into English. The author compared the two English versions and reported that both versions were identical.

Participants (N=57) were selected from four different geographical areas, such as (1) Kabul, (2) Bamyan, (3) Badakhshan, (4) and outside of Afghanistan. Participants from outside of Afghanistan consisted of international staff members and Afghan scholars who had previously worked for Afghan conservation organizations. The three geographical areas (Kabul, Bamyan, and Badakhshan) were selected because Bamyan and Badakhshan are the

two provinces of Afghanistan that contain the two national parks within their territories. Band-e-Amir is the first national park in Afghanistan. Officially announced in 2009 (WCS, 2014), it is located in Bamiyan province. Wakhan national park, which officially opened in 2014 (IUCN, 2014), is located in Badakhshan province. Generally, these two provinces, and specifically the two national parks, contain varieties of fauna as well as human–wildlife conflicts. However, Kabul was selected because the most important wildlife markets operate in Kabul, in two locations, Ka Farushi bird market and Chicken street market.

Survey Procedure: Because it was very difficult to find people to talk about wildlife poaching and illegal markets, it was not possible to select the participants randomly. Participants were interviewed in two different ways: (1) face-to-face, and (2) using NC State University Qualtrics (online survey software). The first method (face-to-face interview) was done with assistance from the Wildlife Conservation Society (WCS) Afghanistan program staff, as well as the author’s previous colleagues in Kabul, Bamyan, and Badakhan. Before launching the survey, the author discussed the survey method and principles with each individual surveyor through Skype. Prior to performing the survey in the field, the surveyor signed the research ethics agreement and agreed that s/he would keep all information generated through this study confidential, would not disclose any information about participants, and would send data through Google Drive only to the author (see Appendix C). The surveyor also instructed that before starting the survey, each respondent should be given the consent letter to sign. Once the survey was completed, the respondents were told that if, they were interested,

the author would like to share their findings and results. If so, then they were asked to write down their email addresses below their names and signatures.

The participants in the second method of survey (online survey) generally were people who had access to the Internet and were working for an environmental organization or academic association. Thirty-four participants were selected based on the author's prior contacts. Of 32 people sent the request to participate, 10 participated and completed the survey. The survey followed a non-anonymous method. An HTML link to the survey was emailed to each participant. In addition, an invitation letter, expressed appreciation and stated that the participant's participation was totally voluntary and their identities would remain confidential.

Data Analysis

In this study, two main research question were determined: (1) What are the drivers of poaching in Afghanistan, and (2) How do Afghanistan's illegal wildlife markets function, and how are they fostered? For the first research question, we were interested to see the relationship of response variable (wildlife condition, hunting intensity) and explanatory variables (poaching drivers, and education levels).

To test the linear relationship between response variable and the explanatory variables, we used Ordinary Least Square regression (OLS). Both response variable and explanatory variable were continuous as assumed for an OLS model. Wildlife condition was coded from 1–7, hunting intensity coded from 1–5, poaching drivers and education levels coded from 1–7. Chi Square test of independence were run to test the association between response variables

and explanatory variables. In order to maintain a minimum of five expected cell count for Chi-square test, we further categorized the variables and excluded those variables which were not necessary and acceptable. For example, poaching drivers collapsed from 7 continuous numbers to 3 categories, wildlife condition from 7 to 2, hunting intensity from 5 to 2, and education levels from seven to three. For example, “don’t know,” “no opinion,” and “others” were excluded from the analysis. However, the result of Chi-square test for “wildlife condition” and “education level” still violated the assumption (Table 6). Therefore, the Fisher’s Exact Test was used. The test is a substitution of Chi-square test when there is a small sample size with non-normal distribution (Freeman & Campbell, 2007). For those test on which the Chi-square assumption was violated, the Fisher Exact test was used.

For the logistic regression test, the wildlife condition was collapsed into two binary categories (1 = threatened, and 0 = not-threatened), and education levels into three (1 = Uneducated/Primary School, 2 = High School/Associate Degree, and 3 = University Level Degree or Higher). All analysis in this study was conducted using Statistical Package for the Social Sciences 22 (SPSS 22) (IBM Corp, 2013) and Statistix 10 software (Analytical Software, 2013).

Results for the second research question (how Afghanistan illegal wildlife markets function and are fostered) were illustrated in charts, tables, figures and other graphics that were created using SPSS 22 graphic tools and Microsoft Excel 2013.

Results

Demographic Characteristics: All demographic statistics are reported in Table 1. The total number of participants in this study was (N = 57). The majority of the respondent [(94.7%), N = 54] were male, and 75.4% were married. Respondents ranged in age from 23 to 70 years old (\bar{x} = 39.0, SD = 13.3). Almost half of the participants [49.1% (N = 28)] had university level degrees or higher, [19.3% (N = 11)] had a high school certificate or associate degree, and almost one-third [31.6% (N = 18)] were uneducated or had primary education. Most of the participants in this study were from Kabul, the capital of Afghanistan [54.4% (N = 31)], or from the Bamyan province [19.3% (N = 11)] or the Badakhshan province [17.5% (N=10)]; only [8.8% (N =5)] were from outside of Afghanistan.

Table 1: Demographic statistics of 57 participants in Afghanistan wildlife poaching and market study

Variables	Categories	N	Percent	Mean	Std	Minimum	Maximum
Gender	Male	54	95	1.1	0.2	1.0	2.0
	Female	3	5				
Marital Status	Married	43	75	0.2	0.4	0.0	1.0
	Single	14	25				
Age	Continuous	57	100	39	13	23	70
Location	Kabul	31	54	1.8	1.0	1.0	4.0
	Bamyan	11	19				
	Badakhshan	10	18				
	Outside of Afghanistan	5	9				

Afghanistan Wildlife Condition Analysis: Participants were asked that what they thought about the condition of Afghanistan's wildlife. Most of the participants (35%) thought that Afghanistan's wildlife was very threatened (N = 20), 32% considered it to be somewhat threatened (N = 7) or 12% slightly threatened (N = 7), 9% classified them as neither threatened nor good (N = 5), 11% reported wildlife was in a good condition (N = 6), and only 2% thought that wildlife was in a very good condition. Generally, most of participants, regardless of age, gender, and education level considered Afghanistan wildlife to be in a threatened condition, and they were worried about the future of wildlife conditions in Afghanistan.

Participants were asked about hunting intensity in their districts or the country overall. The highest response for hunting intensity (26%) recorded for "somewhat heavy" category (N = 15). Twenty-one percent (N = 12) selected "very heavy" category of hunting, and 14% stated that hunting is "slightly heavy" (N=8). However, 23% of respondent believed that hunting is at an "average" level (N = 13), and only 16% (N = 9) respondents stated that hunting is very low. No respondents believed that there is no hunting in Afghanistan.

Nine poaching drivers were presented to respondents: family consumption, medicine, fur, horns and other byproducts, retaliation killing, pet and live trade, high demand in international markets, high demand of foreigners who live and work in Afghanistan, foreigner trophy hunters and national trophy hunters. Respondents were asked to rank the importance of each poaching driver (1 = "least important driver" and 7 = "most important driver"). Overall,

the most important drivers for Afghanistan wildlife reported poaching for FC ($\bar{x} = 4.6$), fur, horn and other byproducts ($\bar{x} = 4.6$), pet and live trade ($\bar{x} = 4.2$), and retaliation killing ($\bar{x} = 4.0$) (Figure 1).

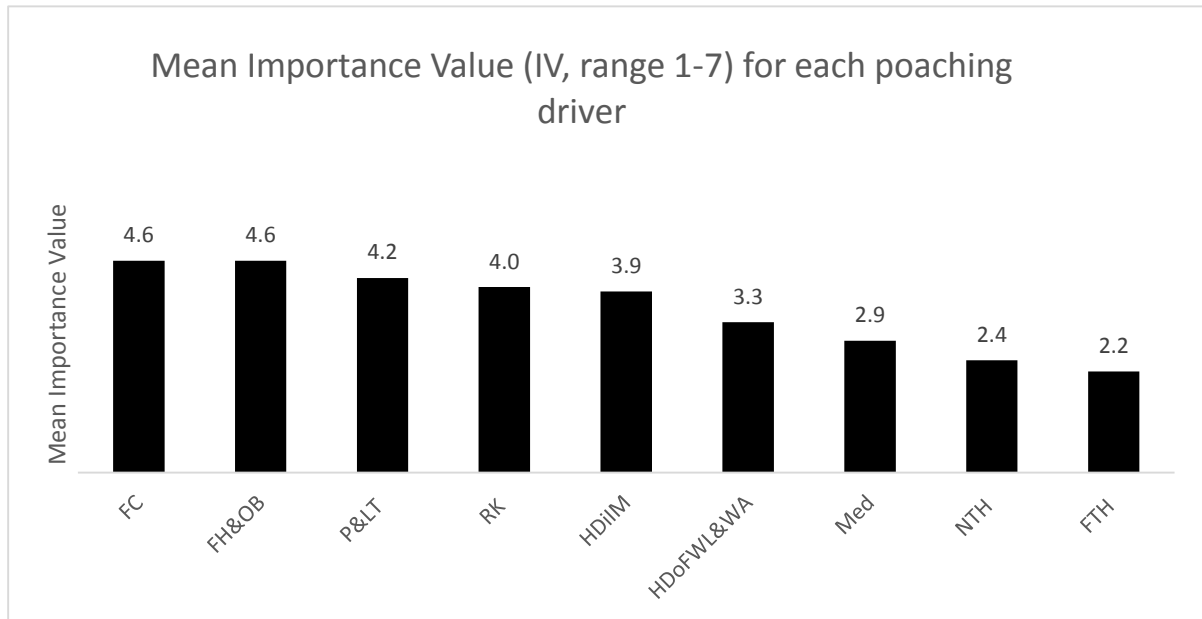


Figure 1: Mean importance value for each poaching driver

FC = Family Consumption, FH&OB = Fur, Horns, and Other By-product, P< = Pet and Live Trade, RK = Retaliation Killing, HDiIM = High Demand in International Markets, HDoFWLA = High Demand of Foreigners who Live and Work in Afghanistan, Med = Medicine, NTH: National Trophy Hunter, FTH = Foreigner trophy hunters

Each poaching driver was tested for specific wildlife type. All wildlife species were categorized into twelve extended categories, from which reptile and amphibian categories were then excluded because of very small sample size. Because there was considered to be a large

problem with leopards and wolves, as main predators, separate category for each was made. The most important category targeted to poaching was ungulates ($N^a = 45$), followed by leopards ($N = 39$), and other predators such fox, cat, stone marten ($N = 31$) (Table 3). Ungulates were mainly hunted for family consumption such as meat ($N = 43$), followed by fur and other byproducts ($N = 20$).

The most important poaching factor for leopard ($N = 33$) and other predators reported ($N = 28$) was fur and other byproducts. However, the most important factor for wolf was retaliation killing ($N = 15$).

In bird groups, the most endangered categories were reported to be predatory birds such as falcons and eagles ($N = 27$). Most predatory birds were poached by Middle Eastern and Pakistani poachers. Predatory birds were taken for pets and live trade ($N = 23$). Upland game birds such as partridge, quail, pigeon, and houbara bustard were mainly poached for pets and live trade ($N = 12$) and for family consumption ($N = 12$). Waterfowls such as ducks were mainly hunted for food purposes ($N = 17$) (Table 3). This study, all Afghanistan provinces were divided into eight zones* (based on Food and Agriculture Organization, United Nations Planning Region Zoning) (Maletta & Faver, 2003). Wildlife of “northeast” provinces were highly targeted to poach (27%), followed by central provinces (22%) (Figure 2). The lowest pressure of wildlife hunting (3%) reported from provinces that fell under “Southwest” and “North” regions (5%).

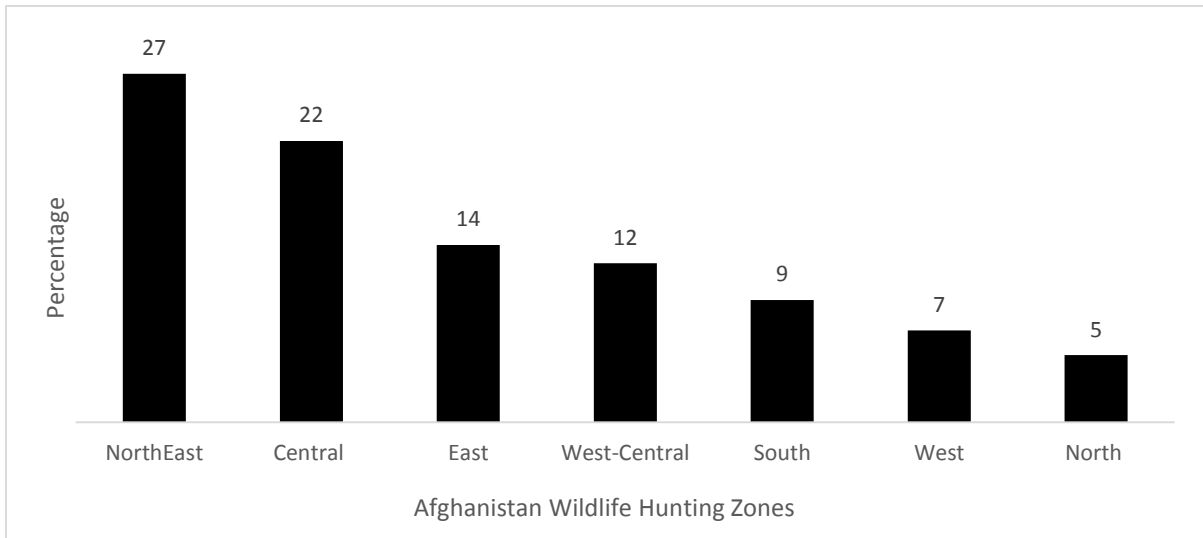


Figure 2: Afghanistan eight ecological zones hunting pressure.

*Zones: **North** (Balkh, Faryab, Jauzjan, Samangan, Sar-i-pul), **NorthEast** (Badakhshan, Baghlan, Kunduz, Takhar), **West** (Herat, Farah, Badghis) **West-Central** (Ghor, Bamyan, Daikundi), **Central** (Kabul, Parwan, Kapisa, Logar, Wardak, Panjshir), **South** (Paktika, Paktya, Khost, Ghazni), **East** (Nangarhar, Laghman, Kunar, Nuristan), SouthWest (Nimroz, Helmand, Kandahar, Zabul, Uruzgan)

Table 2: Afghanistan wildlife poaching drivers based on species categories

N = # respondents

n = # times respondents mention animal, e.g. more than one species

FC = Family Consumption, FH&OB= Fur, Horns, and Other By-product, P< = Pet and Live Trade, RK = Retaliation Killing, Med = Medicine, FTH =, OD = Others Drivers, Rec = Recreational

Species Group	N	n	FC (N)	FC (n)	FH&OB(N)	FH&OB(n)	P<(N)	P<(n)	RK(N)	RK(n)	Med (N)	Med (n)	OD (N)	OD (n)	Rec(N)	Rec(n)
Leopard	39	51			33	33	7	9	8	8			1	1		
Wolf	25	31			15	13			15	15					1	1
Other Predator	31	61	1	1	28	45	6	7	5	7					1	1
Ungulate	45	109	43	64	20	33	3	3							4	9
Other Mammals	4	4			1		1	1	1	1	2	1				
Upland Game Bird	20	37	12	16			12	18			2	3	1	1		
Waterfowl	19	27	17	21	5	6	1	1							1	1
Predatory Birds	27	32					23	27					5	5		
Other Birds	1	14	8	8			2	3	3	3			1	1	3	3
Fish	9	11	8		1	1	1	1			1	1				

Hypothesis Testing

A correlation matrices for all variables in this study are presented in Appendix E. To test the three hypothesis in this study, we used OLS regression model, Chi-square test of independency, Fishers Exact test, and logistic regression.

Hypothesis 1: Hypothesis 1 predicted that poaching drivers have a linear relationship with wildlife condition. It further assumed that poaching drivers have a significantly negative effect on wildlife conditions in Afghanistan.

To test this hypothesis, the following multiple linear regression model was run.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \epsilon_i$$

$$H_0: \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7 = \beta_8 = \beta_9 = 0$$

(Null hypothesis: All poaching drivers are independent of wildlife condition)

$$H_a: \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7 = \beta_8 = \beta_9 \neq 0$$

(Alternate Hypothesis: At least one poaching driver is associated with wildlife condition)

Where Y is wildlife condition, β_0 is the intercept, β_1 is the slope associated with X_1 (FC), β_2 is the slope associated with X_2 (Med), β_3 is the slope associated with X_3 (FH&OB), β_4 is the slope associated with X_4 (RK), β_5 is the slope associated with X_5 (P<), β_6 is the slope associated with X_6 (HDiIM), β_7 is the slope associated with X_7 (HDofWLA), β_8 is the slope associated with X_8 (FTH), β_9 is the slope associated with X_9 (NTH), and ϵ_i is the error term where $\epsilon_i \sim N(0, \sigma_\epsilon^2)$.

Since overall p-value ($P = 0.0037$) is less than α (0.05), therefore we concluded that there is statistically evidence that at least one poaching driver is associated with wildlife condition, controlling for other variables. The overall result for the model was significant at ($\alpha = 0.05$) $R^2 = 0.4724$, $F = 3.48$, $P = 0.0037$, therefore, multicollinearity among poaching drivers exist. This fact implies that each driver may uniquely explain a small part of the variation in wildlife condition, but collectively, the poaching drivers explain a larger part of the variation. Individually, retaliation killing ($P = 0.0048$) and medicinal usage ($P = 0.0391$) were significant predictors of wildlife condition, controlling for the other poaching drivers (Table 3). High demand in international markets, national trophy hunting, and family consumption had a significance level of less than 0.25. The remaining poaching drivers were not significant even at ($\alpha=0.25$) level.

Table 3: Summary of OLS regression analysis for variables predicting wildlife condition

For this regression model, $R^2 = 0.4724$, $F = 3.48$, $P = 0.0037$; $\alpha = 0.05$

FC = Family Consumption, Med = Medicine, FH&OB = Fur, Horns, and Other By-product, RK = Retaliation Killing, P< = Pet and Live Trade, HDiIM = High Demand in International Markets, HDoFWLA = High Demand of Foreigners who Live and Work in Afghanistan, FTH = Foreigner trophy hunters, NTH: National Trophy Hunter

Poaching Drivers	<i>b</i>	<i>SEb</i>	<i>t</i>	<i>P</i>
FC	-0.12143	0.10015	-1.21	0.2335
Med	0.24906	0.11617	2.14	0.0391
FH&OB	0.10006	0.14226	0.7	0.4865
RK	0.33542	0.11124	3.02	0.0048
P<	-0.08021	0.12521	-0.64	0.5259
HDiIM	0.2189	0.1604	1.36	0.181
HDoFWLA	-0.06648	0.11539	-0.58	0.5682
FTH	-0.04155	0.18726	-0.22	0.8257
NTH	0.17031	0.12718	1.34	0.1892

Because the testing of several explanatory variables lower the prediction power of other explanatory variables, there are three methods to choose from in constructing a good model (1) Backward elimination, (2) Forward Selection, and (3) Stepwise regression. For this study, the backward elimination method was used to drop non-significant explanatory variables. First, all potential predictors were used, and then one variable was deleted at a time until all

remaining predictors remain significant (Agresti & Finlay, 2009). In this study, those variables with $p = 0.25$ or greater were eliminated and others remained in the model (Table 4).

Table 4: Summary of OLS regression reduced model for variables predicting wildlife condition

For this regression model, $R^2 = 0.4536$, $F = 9.55$, $P = 0.00$

Med= Medicine, RK= Retaliation Killing, HDiIM= High Demand in International Markets, NTH: National

Poaching Driers	<i>b</i>	<i>SEb</i>	<i>t</i>	<i>P</i>
Med	0.24514	0.09112	2.69	0.0099
RK	0.30939	0.0801	3.86	0.0003
HDiIM	0.16873	0.0888	1.9	0.0637
NTH	0.10196	0.08619	1.18	0.2429

Medicine, retaliation killing, and high demand in international markets had highest significance levels, followed by national trophy hunting. Variables such as foreigners' high demand; foreign trophy hunters; fur, horn and other by-products; pet and live trade; and family consumption were dropped one at a time until all other variables reached $p = 0.25$ or smaller. The variables that were deleted at each stage were the least significant, having a larger p -value and resulting in the smallest decrease in coefficient of determination (R^2). It should be correct to assume that the dropped variable did not have impact on wildlife condition; all of them had an impact on some level of interval, but their impact were not significant much significant and

their p -values less than 0.25. This relationship also understood from correlation matrix (see appendix E).

Hypothesis 2: Hypothesis examined if poaching drivers have a significant linear relationship with hunting intensity. This means that poaching drivers increase hunting intensity in the study areas. In this hypothesis, hunting intensity assumed as response variable and poaching drives like other hypotheses as explanatory variable. To test Hypothesis:

$$H_0: \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7 = \beta_8 = \beta_9 = 0$$

(Null hypothesis: All poaching drivers are independent of hunting intensity)

$$H_a: \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7 = \beta_8 = \beta_9 \neq 0$$

(Alternate Hypothesis: At least one poaching driver is associated with hunting intensity)

The following multiple linear regression model was used.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \epsilon_i$$

Where Y is wildlife condition, β_0 is the intercept, β_1 is the slope associated with X_1 (FC), β_2 is the slope associated with X_2 (Med), β_3 is the slope associated with X_3 (FH&OB), β_4 is the slope associated with X_4 (RK), β_5 is the slope associated with X_5 (P<), β_6 is the slope associated with X_6 (HDiIM), β_7 is the slope associated with X_7 (HDoFWLA), β_8 is the slope associated

with X_8 (FTH), β_9 is the slope associated with X_9 (NTH), and ϵ_i is the error term where $\epsilon_i \sim N(0, \sigma_\epsilon^2)$.

Since overall p-value ($P = 0.0037$) yielded less than α (0.05), therefore we suggested that there is statistically evidence that at least one explanatory variable (poaching drivers) is associated with response variable (wildlife condition), controlling for other variables. The overall result for the model was significant, $R^2 = 0.4724$, $F = 3.48$, $P = 0.0037$, therefore, multicollinearity among poaching drivers exist. This implied that each poaching driver may unequally explain a small proportion of the variation in hunting intensity, but collectively, the poaching drivers explain a larger part of the variation. Medicinal usage ($P = 0.0279$) and national trophy hunting ($P = 0.0477$) were significant predictors of hunting intensity at α 0.05 (Table 5).

Table 5: Summary of OLS regression analysis of poaching drivers that predict hunting intensity

For this regression model, $R^2 = 0.5112$, $F = 4.04$, $P = 0.0012$

FC = Family Consumption, Med = Medicine, FH&OB = Fur, Horns, and Other By-product, RK = Retaliation Killing, P< = Pet and Live Trade, HDiIM = High Demand in International Markets, HDoFWLA = High Demand of Foreigners who Live and Work in Afghanistan, FTH = Foreigner trophy hunters, NTH: National Trophy Hunter, OD = Other Drivers

Poaching Drivers	<i>b</i>	<i>SEb</i>	<i>t</i>	<i>P</i>
FC	0.04443	0.09586	0.46	0.6459
Med	0.25514	0.11119	2.29	0.0279
FH&OB	0.19572	0.13616	1.44	0.1595
RK	0.02905	0.10647	0.27	0.7865
P<	0.003787	0.11984	0.03	0.975
HDiIM	0.16589	0.15352	1.08	0.2873
HDoFWLA	0.10063	0.11044	0.91	0.3685
FTH	-0.13837	0.17923	-0.77	0.4453
NTH	0.24974	0.12173	2.05	0.0477

Since there were nine explanatory variables, and having more variables could reduce the prediction power of the other, higher explanatory variables, the backward selection model used to select the most powerful variables and drop variables that explained little variation. The variables with $p = 0.25$ or greater were eliminated, and others remained in the model (Table 6).

Table 6: Summary of OLS regression reduced model for variables predicting hunting intensity

For this regression model, $R^2 = 0.4858$, $F = 10.16$, $P = 0.000$

FH&OB = Fur, Horns, and Other By-product, Med = Medicine, HDiIM= High Demand in International Markets, NTH: National Trophy Hunter

<i>Poaching Drivers</i>	<i>b</i>	<i>SEb</i>	<i>t</i>	<i>p-value</i>
FH&OB	0.23678	0.10730	2.21	0.0327
Med	0.24123	0.09045	2.67	0.0107
HDiIM	0.12410	0.10516	1.18	0.2444
NTH	0.24712	0.08541	2.89	0.0060

Fur, horn and other byproducts, medicine, and national trophy hunting had highest significance levels, followed by high demand in international markets. Variables such as pet and live trade, retaliation killing, family consumption, foreigner trophy hunting, and the high demand of foreigners who live and work in Afghanistan dropped one at a time until all other variables reached $p = 0.25$ or smaller. The variables that were deleted at each stage were the least significant, having a larger p -value and resulting in the smallest decrease in coefficient of determination (R^2). Variables could of the variables have an impact on some level of interval, but the impacts of some variables were not very significant, with p -values that were less than 0.25. This relationship also understood from correlation matrix (see appendix E)

Hypothesis 3: It was predicted that education levels would be associated with perceptions of wildlife condition. That is, we predicted that highly educated respondents would think that wildlife in Afghanistan was in a worse condition than did the less educated

participants. This is because that higher educated respondents know better about Afghanistan wildlife status, population size, habitat conditions than less educated respondents. It should be also taken under consideration that participants with less education in this study are participants from villages, where they were closer to wildlife territories, while participants with higher educations were from cities, where they were far away from wildlife sources. Therefore, participants with lower education had more local knowledge and thought practical. A Chi-square test was performed to see whether that association existed or not. Chi-square analyses showed that there is an association between education levels and wildlife condition, the following Chi-square test was used.

$$\chi^2 = \sum \frac{(O - E)^2}{E}$$

Where:

χ^2 is the value for chi square.

Σ is the sum.

O is the observed frequency

E is the expected frequency.

Chi-square analyses showed that there is an association between education levels and wildlife condition, $\chi^2 = 9.485$, $p = 0.009$ (Table 7). However, since the Chi-square test assumption was violated, Fisher's Exact test^(a) was used. The Fishers Exact test also showed a statistical association between education levels and wildlife condition.

Table 7: Chi-square test of independence shows association between education and wildlife condition

	<i>Value</i>	<i>df</i>	<i>Asymp. Sig. (2-sided)</i>
Pearson Chi-Square	9.049 ^a	2	0.011
Likelihood Ratio	9.485	2	0.009
Linear-by-Linear Association	6.939	1	0.008
N of Valid Cases	57		

1 cells (16.7%) have expected count less than 5. The minimum expected count is 3.67.

(a) Fisher's Exact test for this hypothesis, $p = 0.0099$

Because the Chi-square test was designed to illustrate the association between variables, it is not able to test the effect of explanatory variables on response variable. Therefore, logistic regression was used to test this hypothesis. Based on logistic regression output, there is a statistically linear relationship between education and perceptions of wildlife condition ($p = 0.0104$) (Table 8). Coefficient (b) had a positive value; therefore, by increasing one unit education level, perception of wildlife condition increased 0.87 times, or 87%. This means that by increasing one unit in education level, perception of wildlife condition increased by 0.87 unit. This finding implied that participants who had higher education levels were more concerned about Afghanistan's wildlife condition. This because participants with higher education would know more about wildlife population, threats, and conflicts and also think more globally. By contrast, participants with lower education did not have this information and were more likely to think that everything was in a normal condition.

Table 8: Logistic regression results for impact of education levels on wildlife condition

Predictor	<i>B</i>	<i>Seb</i>	Coef/SE	<i>P</i>
Variables				
Constant	-1.11714	0.73783	-1.51	0.13
Education	0.87386	0.3411	2.56	0.0104

Afghanistan’s Illegal Wildlife Markets

As indicated earlier, this study addresses two main questions: (1) What are the poaching drivers in Afghanistan, and (2) How do Afghanistan’s illegal wildlife markets function, and how are they fostered? In this section, we explore how illegal wildlife markets function and who is supporting and fostering the markets in Afghanistan.

We asked participants, “Where are the hunters coming from? And how do they transport their products to the markets?” According to the participants, more than half of the hunters are local and hunt in their own districts. Hunters going from one province to other to poach wildlife accounted for a total of 23.4% (Table 9). In addition, foreigners also played a significant role in Afghanistan’s wildlife poaching, accounting for 18%. Generally, hunters transported their products either by themselves (46.8%) or sold their take to peddlers (49.4%) who then transported the products to markets.

Table 9: Afghanistan wildlife hunters' origin and transportation type

Hunter's Origin	Percentage	Transportation Type	Percentage
Local	55.3	By Themselves	46.8
Coming from different provinces	23.4	Through Peddlers	49.4
Foreigners	18.1	Others	3.9
Others	3.2		

Most of the poachers brought their product directly to the provincial markets (29%), while some of them sold their products to peddlers who were going to village to village (Figure 3). Nineteen percent reported that hunters sold their product to Kabul markets, 11% transported their products to neighboring countries, 7% transported to international markets beyond neighboring countries, and 7% sold directly to foreigners who were living or was working in Afghanistan (Figure 3).

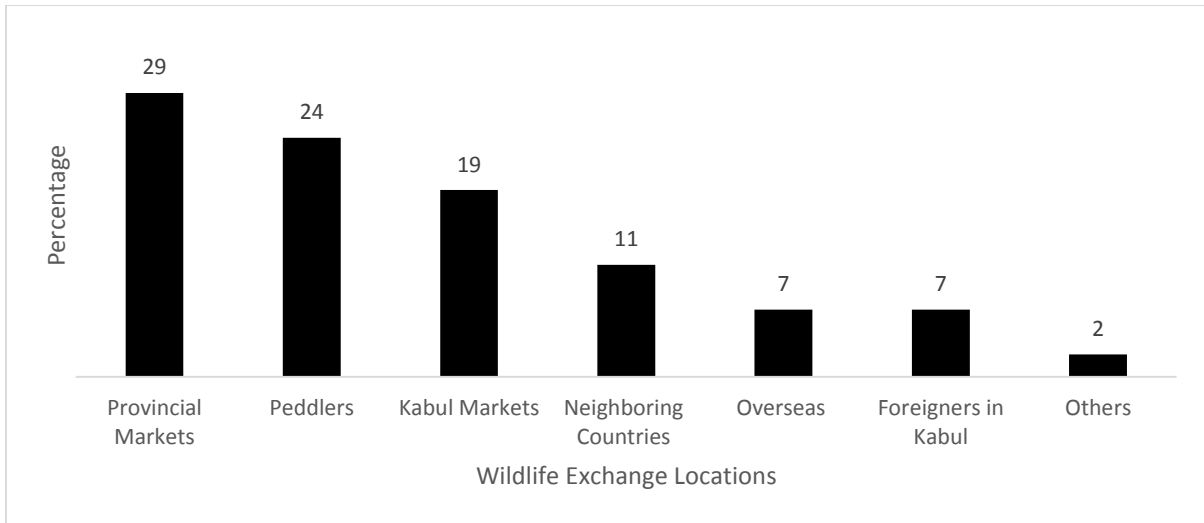


Figure 3: Afghanistan wildlife exchange locations

Most of Afghanistan's wild species were exported to Middle East countries (N = 61) such as Saudi Arabia, United Arab Emirate (UAE), Qatar, and Iran. The most important species for Middle East countries were predatory birds such as falcons and eagles (n = 40) (Table 10). The second most important country that received wildlife or wild products from Afghanistan was Pakistan (N = 58). The important species type for Pakistan reported was also predatory birds (n = 18) and ungulates (n = 12). One must take into consideration that if we compare country to country, Pakistan has highest rate of importing wildlife from Afghanistan because the others are a groups of countries.

Afghanistan's wildlife is also exported to western countries such as the United States, Canada, Australia, and most European countries (N = 34). The highest-turnover species exported to western countries are "other predators" species (n = 16) such as Fox, Dog, Cat, Stone Marten, Lynx, and Jackal. Foreign Poachers from Pakistan and Middle Eastern countries such as Saudi Arabia, Qatar and United Arab Emirate came to Afghanistan and were searching for bird especially predatory birds such eagle, falcons and houbara bustard.

Exporting Afghanistan wildlife or wildlife byproducts to other countries such as Tajikistan, Russia, India, and China is also reported (N = 16). The most-exported species were reported to be the "other predator" species, such as Fox, Dog, Cat, Stone Marten, Lynx, and Jackal (n=9) (Table 10).

Table 10: Afghanistan wildlife species exported to the international markets

Regions	Total Export		A. Animals		Leo		Wolf		O. predator		P. Birds		O. Birds		Amp		Ung		FH&BP	
	N	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Pakistan	58	33.5	4	6.9	8	14			4	6.9	18	31	3	5.2			12	21	9	16
Middle East	61	35.3			6	9.8					40	65.6	7	11			8	13		
Western Countries	34	19.7					4	12	16	47.1									14	41
Other Countries	16	9.2							9	56.25							4	25	3	19
Over the world	4	2.3					1	25	2	50					1	25				

N = total number of time respondents mentioned animal

n = total number of time respondents mentioned for species type or products

A. Animal = All Animals, Leo = Leopard, O. Predator = Other Predator, P. Birds = Predatory Birds, O. Birds = Other Birds, Amp = Amphibians, FH&BP = Fur, Horn and Other By-products

List of Countries in this study:

Middle East = Saudi Arabia, United Arab Emirate, Qatar, Iran

Western Countries = United States, Canada, European Union's Countries, Australia

Other Countries = Tajikistan, Russia, China, and India

Afghanistan Wildlife Poaching and Illegal Market Deterioration Mechanisms

More than 99% of participants in this study believed that there are some tools and policies that could be helpful to halt wildlife poaching and illegal wildlife markets in Afghanistan. All deterrents for wildlife poaching and illegal markets that the respondents stated were classified into eight different categories. The most important deterrent for both wildlife poaching and illegal market deterioration was establishing and enforcing laws and regulations. Respondents (N = 47) mentioned that establishing and enforcing laws and regulations was a useful policy that would be able to stop or at least decrease wildlife poaching (Table 11). For illegal wildlife markets, establishing and enforcing laws and regulations was also reported as an important deterrent (N = 44).

The second most important deterrent that participants reported for both wildlife poaching and illegal markets was the launching of awareness, education, and capacity building programs. The third tool that the participants mentioned as an important deterrent was to provide a livelihood opportunity for wildlife poaching (N = 22) and illegal market function (N = 12) is (Table 11). However, establishing security, ensuring cooperation among relevant organizations, funding sustainable wildlife management, monitoring an evaluation, and other deterrents were presented (Table 11).

Table 11: Tools and policies proposed for the deterrence of wildlife poaching and illegal markets

Poaching Deterrents	N	%	Market Deterrent	N	%
E&EL&R	47	38.5	E&EL&R	44	45.8
AE&CB	22	18.0	AE&CB	16	16.7
PLA	21	17.2	PLA	12	12.5
ES	11	9.0	ES	4	4.2
FSWMP	8	6.6	FSWMP	4	4.2
Cop	5	4.1	C	9	9.4
M&E	3	2.5	M&E	3	3.1
OD	8	4.1	OD	4	4.2

N = number of times respondents mentioned deterrent

E&EL&R: Establishing and Enforcing Laws and Regulations

AE&CB: Awareness, Education, and Capacity Building

ES: Establishing Security

PLA: Providing Livelihood Alternatives

Cop: Cooperation

M&E: Market Monitoring and Evaluation

FSWMP: Funding Sustainable Wildlife Management Program

OD: Other Deterrents

Discussion

One purpose of this survey effort was to determine the motivations for wildlife poaching in Afghanistan and test whether these motivations have any significant impact on wildlife conditions in Afghanistan. Another, related purpose was to understand how illegal wildlife markets function and are fostered in Afghanistan. We identified important poaching drivers and determined how illegal markets function.

In general, Afghanistan wildlife species are mainly hunted for family consumption, fur, horn and other byproducts; another less common driver is retaliation killing. The main reason for killing wildlife for meat, fur, and retaliation is the poor economic situation of the rural people. UNEP (2006) reported that the majority of the people who live in rural areas are poor families and do not have access to expensive food, particularly meat. Therefore, they are heavily dependent on wildlife hunting. In addition, people in Badakhshan usually hunt Ibex for their meat and consume it during winter (Ostrowski et al, 2008a). Musk deer is targeted to hunt because of its delicious meat, as well as the high price of musk pod and its skin in markets (Habibi, 2003; Sayer & Van der Zon, 1981; Karlstetter, 2008).

Although this study found that wildlife are targeted for poaching more for fur and other products rather than for retaliation killing, it should be recognized that in some cases the first reason for poaching, especially in the case of carnivores, is retaliation. For instance, Mishra and Fitzherbert (2004) reported that most of the predators, for example snow leopards, are not

mainly targeted to hunt for their fur purposes; rather, people hunt the species to save their livestock from predator attacks or, in some cases, people kill the predators for revenge.

The poaching of wild species depends on the species type, species availability in given area, and the influence of market demands. For example, our results show that leopards and other predators are mainly poached for fur and other products, while wolves are mainly poached for retaliation killing. Since wolves are a lower-altitude species and live closer to communities' livestock, they are more likely to attack sheep and goats and then be easily shot by community members. By contrast, leopard are a higher-altitude species and live far away from communities, so they usually attack their natural prey (rarely yaks) (Habib, 2008). Market prices influence species poaching motivation. Since the price of leopard skin is significantly higher than that of wolf, fur is the main motivation for leopard poaching, as reported in this study. For example, a single skin of leopard costs up to \$300 USD (Mishra & Fitzherbert, 2004), while a wolf skin price cannot be more than \$50 USD (Moheb & Mustafawi, 2013).

Wildlife poaching intensity, as based on eight zones, was reported differently in this study. Northeast, central, east and west-central are the zones that the wildlife poaching intensity is higher compared to the other zones. This difference can be explained by the non-normal sampling distribution and the existence of the two Afghanistan national parks with an abundance of wildlife that are located in northeast and west central Afghanistan (Band-Amir and Wakhan). The samples were collected from Badakhshan, Bamyan, and Kabul, and the respondents' first thought would be their one province or regional provinces. In addition, in

the last ten years, these zones were somewhat secure, and more research and education have been conducted, which can directly and indirectly impact respondents' awareness of poaching activities. With increasing sample size and sample normality assumption, the finding can be more accurate.

To summarize, this study considered data from both paper surveys (face-to-face interviews) and Web-based surveys to explain the wildlife conditions and hunting intensity in Afghanistan. Hypothesis 1 and hypothesis 2 were predicted that wildlife condition and hunting intensity had statistically relationship with poaching drivers. Both hypotheses yielded an overall significant statistical relationship among wildlife condition, hunting intensity, and poaching drivers. The key drivers for wildlife condition and hunting intensity were medicine, retaliation killing, high demand in international markets, fur, horn and other byproducts, and national trophy hunting at $\alpha = 0.005$. The statistically significant relationship at ($\alpha = 0.05$) of retaliation killing and the medicinal usage of wildlife for wildlife condition as well as national trophy hunting and medicinal purpose at ($\alpha = 0.05$) for hunting intensity can lead us to assume that all wildlife poaching drivers can have negative effect on wildlife conditions and hunting intensity. For example, retaliation killing of predators can encourage the poaching of leopard and other predators for fur and market purposes. Leopards are not generally hunted for their fur, but rather for retaliation purposes. However, when the animal is hunted, poachers or villager skin the animal and discard the rest of the body and sell the skin to peddlers (Mishra & Fitzherbert, 2004; UNEP, 2003a). Therefore, there might be relationships between poaching

drivers that need future research. In addition, the correlation for other poaching drivers showed a relationship; these relationships may weak, but they are still worthwhile to considering.

Hypothesis 3 stated that there was a significant association between a population's educational level and the wildlife condition in that area. The findings for this hypothesis suggested that, by increasing education levels in provinces and also in the capital (Kabul), people's knowledge regarding wildlife conditions would increase. People with higher education levels tended to consider wildlife conditions to be under greater threat as compared to people with lower education levels. For example, those participants with university degrees or graduate degrees thought that Afghanistan wildlife was very much threatened, while those participants who had little or no formal education, perhaps only primary school knowledge, considered Afghanistan's wildlife to be in a less threatened condition. Although there is not much literature that examines the influence of education levels on wildlife conditions or hunting intensity, Poulsen et al. (2012) have shown that environmental education and capacity-building in Congo had significant positive effects on participants' behavior toward endangered species and wildlife conservation.

Acknowledging that the results of this study support the hypotheses overall, the implication that the relationship among poaching drivers, wildlife condition, and hunting intensity is empirical makes it useful for policy recommendation and practical decision-making on wildlife management. The main findings reveal that education has a significant impact on understanding of wildlife condition. In addition, one of the most important deterrents for

wildlife poaching and illegal market deterioration would be education and awareness programs. These programs, especially in the region with high human wildlife conflicts, could be a practical policy to decrease or stop poaching and halt the illegal markets. All tools and policies found in this study, such as establishing and enforcing laws and regulations, providing livelihood alternatives, and connecting people to nature, are practical ways to deal with wildlife problem in Afghanistan.

The study has limitations of course. First, the study was limited to only three geographical areas (Kabul, Bamyan, and Badakhshan), with limited and non-random sample size. This limits information to these three geographical areas but it was focused on key provinces. Second, the context of this study was somewhat sensitive (poaching and illegal markets studies), and also the surveyors were from an environmental organization that most of the respondent might familiar with them. Anonymity was not observed completely in the survey. The respondents might not have provided all necessary information regarding wildlife poaching and illegal markets. Much literature has paid a significant attention to how respondents should be treated with sensitive questions and surveys (e.g. Joinson et al 2007; Couper et al 2003). Sensitive or very personal questions are often being asked in medication sector and social science surveys. Yu et al (2003) presented two methods, namely “the triangular and crosswise models” for surveys that contain sensitive questions. These models do not depend on randomization condition; they are easy to implement; the interviewee does not face any sensitive questions; and they apply to both in-person and Internet methods. These

model are highly recommend for wildlife poaching and illegal market studies and need further research to examine these models in Afghanistan wildlife poaching and illegal markets context.

More research is needed to expand this study for the entirety of Afghanistan with a higher and randomized sample size. Further studies should be conducted to test the relationship among poaching drivers. To date, no study has yet been conducted to test whether there is any kind of relationship among retaliation killing and fur trade, national trophy hunting, markets demands, and wildlife trade. The impact of education levels on illegal hunting were not discussed before in the context of Afghanistan. More research is needed to test whether or not increasing education and awareness would have positive or negative effects on hunting intensity and wildlife markets functions.

Conclusion

Understanding the motivations for wildlife poaching and the functions of illegal markets is critically important for the management and conservation of Afghanistan's wildlife. Family consumption; fur, horn and other by-products; pet and live trade; and retaliation killing are the most important drivers of wildlife poaching in Afghanistan. Education plays a positive role in fostering understanding of wildlife conditions and hunting intensity. Thus, funding education programs, enforcing laws and regulations, and determining alternative livelihoods, especially in rural areas, can remedy the poor situation of wildlife in Afghanistan.

In Afghanistan, most hunters are local or come from regional provinces. Once the hunters hunt the prey, then either transport their prey themselves or sell to a peddler who then brings it to provincial or national markets. Most of the market chain is performed by Afghans, therefore, role of national laws and regulations, public awareness program, and alternative projects are critically important to limit or halt illegal markets.

Having glimpsed the gorgeous spectacle of Afghanistan's biodiversity and the significant potential challenges to maintaining that biodiversity, we still watch as poachers deteriorate these valuable natural resource and threaten our natural dignity with extinction. This reminds me of a line from my favorite comedian, Ellen DeGeneres: "I ask people why they have deer heads on their walls. They always say because it's such a beautiful animal. There you go. I think my mother is attractive, but I have photographs of her." Animals belong in nature, and if we are to go into their habitats and hunt them, we ought to first engage in a dialogue about wildlife population control and principles of sustainable use.

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APPENDICES

Appendix A: Afghanistan Wildlife and Markets Survey

1. Gender?
 - Male
 - Female
2. Marital status?
 - Single
 - Married
3. How old are you? _____
4. In which district or village do you currently live? _____
5. What is your current occupation? _____
6. What is the highest level of education you have completed? (Please select one)
 - Never been to school (uneducated)
 - Less than high school graduation
 - High school graduation or certificate
 - Vocational or technical school
 - Associates Degree (2 year degree)
 - Bachelor degree (4 year college graduation)
 - Graduate level degree
 - Others (Please specify):_____

7. Overall, what do you think about Afghanistan's wildlife condition?

- Very threatened
- Somewhat threatened
- Nether threatened nor good
- Good
- Very good
- Excellent
- Don't know
- No opinion

8. Overall, how is the hunting intensity in Afghanistan?

- Very heavy
- Somewhat heavy
- Slightly heavy
- Average
- Low
- Very Low
- Not at all
- Others: please specify -----

9. What wild animals more targeted to hunting and why? Please name all those animals and the reasons for their hunt in the following table?

Name of Animal	Reason for hunting

10. On a scale of 1-7, please rate importance of hunting drivers. What is the main reason that people hunt Afghanistan's wildlife? Please circle a number for each driver, where 1 = less important driver and 7 = very important driver

Hunting Drivers	Less important	Neutral			Very important		
	1	2	3	4	5	6	7
Hunting for family consumption (poverty)	1	2	3	4	5	6	7
Hunting for medical purposes	1	2	3	4	5	6	7
Hunting for furs, horns, and other byproducts	1	2	3	4	5	6	7
Hunting for sake of livestock retaliation	1	2	3	4	5	6	7
Live trade (capture for pet/fighting/songbirds purposes)	1	2	3	4	5	6	7
Hunting because of high demands in international markets	1	2	3	4	5	6	7
Hunting because of demands of foreigners who live and work in Afghanistan	1	2	3	4	5	6	7
Foreigner trophy hunters	1	2	3	4	5	6	7
National trophy hunters	1	2	3	4	5	6	7
Others (please specify)	1	2	3	4	5	6	7

11. Which province or district of Afghanistan's wildlife mainly subjected to hunting or fishing? Please list all the areas.

12. Generally, where the hunters come from? Please check all that apply.

- Hunters are local (they live in the area)
- Hunters coming from different provinces
- Hunters are foreigners
- Others: please specify -----

13. How do hunters transport their products to the markets? Please check all that apply.

- Hunters transport their own products
- Hunters sell their products to traders who then transport to market
- Others: please specify -----

14. Where do hunters sell their take? Please check all that apply.

- To peddlers who going village to village
- To their own province markets
- To Kabul markets
- Directly to foreigners who live or work in Afghanistan
- Transported to neighboring countries
- Transported to international markets beyond neighboring countries
- Others: please specify -----

15. Who are buyers? Please check all that apply.

- Afghans
- Foreigners from neighboring countries
- Foreigners from international communities beyond the neighboring countries
- Others, please specify -----

16. To which countries are Afghanistan's wildlife take usually exported? Please name all the country or countries and wildlife type.

Name of Country	Type of Wildlife

17. Do you think there are any deterrents to stop illegal hunting in Afghanistan?

- If Yes: which deterrents do you think will help to stop hunting in Afghanistan?
- If No: how do you see status of Afghanistan's wildlife in future?
 - Their status will remain stable
 - Their status will become more endanger
 - Their status will become better

18. Do you think there are any ways to stop or decrease wildlife illegal markets function in Afghanistan?

- If Yes: How?
- If No: Why?
- No Opinion

Thank you for your participation! If you would like to add any additional comments, please use the space bellow.

Appendix B: Consent Paper

Title of Study: Afghanistan Wildlife and Market Survey

Institution: North Carolina State University, College of Natural Resources

Principal investigator: Mujtaba Bashari

Filed Surveyor: _____

Dear Participant:

I am conducting a survey of people who have scientific background, professional experience, or are otherwise familiar with wildlife management, hunting, and conservation in Afghanistan. The survey is a part of Mujtaba Bashari's education at North Carolina State University in the United States of America. My research will establish baseline data on wildlife conservation and management in Afghanistan. I expect that it will take 30 to 40 minutes to answer all of the questions, although that depends on how much detail you provide.

Your Participation in this survey is totally voluntary and there is not any penalty for refusing to participate. You have the right to withdraw from this survey at any time. We are not interested in your name and any other characteristic of your identity. However, if you reveal any information during the survey that could disclose your identity, we will not include that information in our final results. In addition, the questionnaire does not include any sensitive question that could jeopardize your position, but nonetheless, we will maintain strict confidentiality. For example, we are not asking whether you break any hunting rules or regulations, or committed to any crime. But simply we ask you to share your opinions and thoughts about the status of Afghanistan's wildlife, including the drivers of hunting and markets for wildlife products. When the study is complete, I would like to share my findings with you, if you are interested, for that purpose only, please writes your email address below your name, signature, and date on this sheet, if you are interested in receiving a copy of the results

What if you have questions about this study?

If you have questions at any time about the study or the procedures, you may contact Mujtaba Bashari by Email: mbashar@ncsu.edu or mobile phone in the USA: 919 – 525 – 6168

What if you have questions about your rights as a research participant?

If you feel you have not been treated according to the descriptions in this form, or your rights as a participant in research have been violated during the course of this project, you may contact Deb Paxton, Regulatory Compliance Administrator, Box 7514, NCSU Campus (919 - 515-4514).

Consent to participants:

“I have read and understand the above information. I have received a copy of this form. I agree to participate in this study with the understanding that I may choose not to participate or to stop participating at any time without penalty or loss of benefits to which I am otherwise entitled.”

Subject's signature _____ Date _____

PI's signature _____ Date **June 24, 2014**

Field surveyor's signature _____ Date _____

If you are interested in receiving a copy of my findings, please provide your email address below:

Appendix C: Research Ethics Agreement

Field Surveyor Name: _____

In this research study, you will be investigating illegal wildlife trade and markets by implementing interviews.

By signing this ethics agreement form you also agree to the behavior and expectations listed below. These expectations have been discussed with you by Mujtaba Bashari the principal investigator:

(Date):_____.

Please read the following statements and use a tick mark next to each statement to confirm that you have read and understand each expectation.

_____ I will keep all information generated through my work on this study confidential.

_____ I will not disclose any information about participants in this research to any person outside of the principal investigator.

_____ I will just send all data generated from this research through Google Drive which provided to me by principle investigator.

Signing this ethics agreement form means that you have read, understand and respect the ethics and privacy concerns involved in this study.

If you fail to follow these principles you may be asked to leave the project.

Please sign and scan this form and send back to the Principal investigator.

Sign Your Name Here

Today's Date

Appendix D: Correlation Coefficient (Pearson) for all variables

Variables	Edu	WC	HI	FC	Med	FH&OB	RK	P<	HDiIM	HDoFWLA	NFH	FTH
Edu Pearson Correlation	1	.349**	.528**	.232	.116	.361*	.233	.525**	.440**	.466**	.558**	.430**
Sig. (2-tailed)		.008	.000	.083	.401	.011	.086	.000	.001	.000	.000	.001
N	57	57	57	57	55	49	55	55	55	55	55	56
WC Pearson Correlation	.349**	1	.557**	.114	.425**	.355*	.471**	.313*	.388**	.199	.385**	.257
Sig. (2-tailed)	.008		.000	.398	.001	.012	.000	.020	.003	.145	.004	.056
N	57	58	57	57	55	49	55	55	55	55	55	56
HI Pearson Correlation	.528**	.557**	1	.208	.438**	.453**	.190	.366**	.496**	.345**	.405**	.381**
Sig. (2-tailed)	.000	.000		.120	.001	.001	.165	.006	.000	.010	.002	.004
N	57	57	59	57	55	49	55	55	55	55	55	56

Appendix D continued

FC	Pearson Correlation	.232	.114	.208	1	.124	.348*	.245	.216	.142	-.031	.188	.055
	Sig. (2-tailed)	.083	.398	.120		.368	.014	.072	.113	.302	.820	.170	.685
	N	57	57	57	57	55	49	55	55	55	55	55	56
Med	Pearson Correlation	.116	.425**	.438**	.124	1	.122	.028	.120	.339*	.205	.296*	.056
	Sig. (2-tailed)	.401	.001	.001	.368		.404	.843	.393	.013	.142	.031	.690
	N	55	55	55	55	55	49	53	53	53	53	53	54
FH& OB	Pearson Correlation	.361*	.355*	.453**	.348*	.122	1	.348*	.382**	.563**	.276	.378**	.042
	Sig. (2-tailed)	.011	.012	.001	.014	.404		.017	.008	.000	.061	.008	.776
	N	49	49	49	49	49	49	47	47	48	47	48	48
RK	Pearson Correlation	.233	.471**	.190	.245	.028	.348*	1	.338*	.010	.129	.307*	.123
	Sig. (2-tailed)	.086	.000	.165	.072	.843	.017		.012	.941	.357	.025	.374
	N	55	55	55	55	53	47	55	55	53	53	53	54

Appendix D continued

P<	Pearson Correlation	.525**	.313*	.366**	.216	.120	.382**	.338*	1	.478**	.186	.344*	.407**
	Sig. (2-tailed)	.000	.020	.006	.113	.393	.008	.012		.000	.183	.012	.002
	N	55	55	55	55	53	47	55	55	53	53	53	54
HdiIM	Pearson Correlation	.440**	.388**	.496**	.142	.339*	.563**	.010	.478**	1	.446**	.495**	.277*
	Sig. (2-tailed)	.001	.003	.000	.302	.013	.000	.941	.000		.001	.000	.041
	N	55	55	55	55	53	48	53	53	55	54	54	55
HdoFW LWA	Pearson Correlation	.466**	.199	.345**	-.031	.205	.276	.129	.186	.446**	1	.489**	.356**
	Sig. (2-tailed)	.000	.145	.010	.820	.142	.061	.357	.183	.001		.000	.008
	N	55	55	55	55	53	47	53	53	54	55	54	55
FTH	Pearson Correlation	.558**	.385**	.405**	.188	.296*	.378**	.307*	.344*	.495**	.489**	1	.542**
	Sig. (2-tailed)	.000	.004	.002	.170	.031	.008	.025	.012	.000	.000		.000
	N	55	55	55	55	53	48	53	53	54	54	55	55
NTH	Pearson Correlation	.430**	.257	.381**	.055	.056	.042	.123	.407**	.277*	.356**	.542**	1
	Sig. (2-tailed)	.001	.056	.004	.685	.690	.776	.374	.002	.041	.008	.000	
	N	56	56	56	56	54	48	54	54	55	55	55	56

Appendix D continued

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).
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FC= Family Consumption, Med= Medicine, FH&OB= Fur, Horns, and Other By-product, RK= Retaliation Killing, P<= Pet and Live Trade, HDiIM= High Demand in International Markets, HDofWLA= High Demand of Foreigners who Live and Work in Afghanistan, FTH= Foreigner trophy hunters, NTH: National Trophy Hunter

CHAPTER 4

Synthesis and Policy Recommendations

Chapters 2 and 3 investigated motivations for wildlife poaching and illegal wildlife market chains, each with a different method. Chapter 2 described a meta-analysis that was performed in order to outline some important poaching drivers and analyze how wildlife markets function and foster poaching. Chapter 3 described a face-to-face survey and web-based survey that were conducted to determine wildlife poaching drivers and illegal market flow chains. Both methods addressed how wildlife or by products are transported to provincial and national markets.

According to the meta-analysis, the main motivations for poaching of Afghanistan's wildlife were fur trade, retaliation killing, pet and live trade, and family consumption. The analysis also found that the most important poaching motivations for Afghanistan's carnivore species were fur trade and retaliation killing. Moreover, we found that Afghanistan's antelopes were mainly hunted for family consumption (meat), and birds were mostly hunted for live trade. The most important poaching drivers for other categories of species that did not fall under these three categories were family consumption and fur trade.

The findings of Chapter 3 supported the results of Chapter 2: family consumption; fur, horn and other byproducts; pet and live trade; and retaliation killing of wildlife species were all listed as critical drivers of poaching. Only one small difference was evident between the results of the two methods: the meta-analysis method found family consumption to be the

fourth driver of poaching, while survey results found it to be the first driver. This difference may be attributable to differences in research methodology, sampling distribution, and time zone. The meta-analysis covered all published and unpublished materials and papers since 1970, while the survey represents very recent data.

Because both methods revealed that wildlife poaching motivation, beside retaliation killing, are mainly rooted with wildlife market such as fur trade, species live trade, national and international demand, we presented a market chain flow (see result section, Chapter 2) that shows how Afghanistan's illegal wildlife products are transported from hunting areas to national and international markets. Here we recommend some tools and policies that might be effective in eradicating the Afghanistan wildlife market chain. Different stages can be followed in order to help stop illegal hunting and regulate the wildlife markets according to Afghanistan's environmental laws and regulations, as well as international conventions that Afghanistan has signed or ratified, such as CITES.

To break the wildlife supply chain and halt illegal markets, we must first to break down the supply chain into different stages. In addition, we need to consider alternative resources and projects that meet the affected stakeholders' demands, including local poachers, local community members, and vendors at the provincial and national levels. Ultimately, we need to substitute and shift purchasing power of foreigners from illegal wildlife products to legal products such carpets, rugs, and jewelry.

Based on the results of the meta-analysis and the field survey of Afghanistan wildlife poaching motivation and illegal wildlife market assessments, we can suggest the following policies and programs that could be effective to stop or decrease illegal poaching and markets in Afghanistan.

Enforcement of Laws and regulations

Based on participant interviews conducted for this study, the most important deterrent of poaching is the establishment and enforcement of environmental laws and regulations. Regulation is an important tool for common-pool goods (e.g. wildlife, public forest, and the ocean) to prevent negative externalities and overharvesting (Cubbage, Haou & Sills, 2007). However, the creation of new laws and regulations without enforcement on the ground may have little impact. Enforcing laws and regulations in a poor country with high corruption levels might be very hard, although it is still possible.

National laws and regulations

Afghanistan's wildlife issues should be considered based on national and international laws and regulations. Although Afghanistan has Environmental Law and Forest Law, and filled a significant legislation gap at the national level, they are not completely sufficient and cannot solve the current problem by themselves. For example, to date, neither Afghanistan's environmental law nor its Forest Law discusses civil penalties or how to deal with poachers

and those who committed illegal wildlife trade. Therefore, like this example, there are some other legal gaps that should be remedied.

In order to fill the legal gaps, the Afghanistan government should pass the Wildlife Management Law, which is defined by the Environmental Law. Once it approved by Afghanistan Congress and signed by the president, then National Environmental Protection Agency (NEPA) will, with the cooperation of executive agencies, be able to manage domestic and international wildlife trade, regulate hunting, and issue hunting licenses (Wildlife Management Law-draft, 2011). In addition, the CITES Implementation Regulation draft should be approved. This regulation would equip the Afghanistan Wildlife Executive Committee (AWEC) as the Scientific Authority of Afghanistan as required by CITES (CITES Implementation Regulation-draft, 2010).

Once all these laws and regulations are approved, then implementing agencies would be able to regulate their activities based on the existing rules and regulation. Because there were not complete rules and regulations, implementing agencies were not able to regulate and manage wildlife trade.

The illegal wildlife trade will not shrink unless the management agencies can strictly implement the existing rules and regulations. In some cases, Afghanistan's environmental law is sufficient, but the implementing agencies do not execute their jobs and do not implement the laws. For example, Article 57 of Afghanistan's Environmental Law (2007) stated, No person

shall possess, transport, sell, offer for sale or purchase any specimen of any species listed under Article 47 or product made from any specimen of any species listed under Article 47 which has been illegally imported, taken from the wild, or otherwise not lawfully acquired without a valid permit. Therefore, buying, selling, and bartering of Afghanistan wildlife protected species are legally forbidden, and their services are illegal. Nonetheless, Afghanistan's endangered species and their byproducts are openly traded in Kabul's wildlife markets such as Ka Farushi and Chicken Street market; and NEPA, MAIL, and other responsible organizations do not take sufficient notice of these activities. Therefore, it is critically important that besides creating new rules and regulations, the responsible agencies have enough funds, personnel, and clout to implement existing rules and regulation in order to stop illegal hunting and illegal trade of Afghanistan wildlife.

International Regulations

Wildlife, especially wild animals, are usually considered to be an international issue and should be discussed at international levels. Wildlife do not recognize any boundaries and can easily cross borders. Shipping wildlife to black markets through borders, airports, and harbors requires bilateral or multilateral agreement and efforts. For example, as Chapter 3 of this study found, Afghanistan's wild species are being transported to international markets, not only to Pakistan and Middle Eastern countries but also to overseas countries such as the United States, Canada, Australia, and most European Union states. All this illegal transportation via

land or air transportation requires multilateral efforts on the part of Afghanistan, Pakistan, and other importer countries.

At the international level, these kinds of problems might be solved by using the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and the imported countries' laws and regulations. For instance, U.S. military personnel who are serving in Afghanistan bring wildlife products illegally to their homes in the United States or send them home through the military postal system. In this case, the Afghan government should request that the U.S. federal or state government provide assistance, using the Endangered Species Act, Lacey Act, and other state and federal laws and regulations that apply to this case. Meanwhile, CITES regulates international trade, which means that all wild animals and plants that are imported, exported, and re-exported are covered by the convention and require specific licenses (CITES, 2013).

Afghanistan is one of the cooperating members of CITES and has the right to use the convention. In addition, Afghanistan's neighboring countries, such as Pakistan, Iran, China, and Uzbekistan, except Tajikistan, and Turkmenistan also ratified CITES and are members of the convention. Countries such as the United Arab Emirates, Saudi Arabia, and Qatar that have high purchasing power of Afghanistan wildlife, especially the predatory birds, have also ratified the convention and managed under CITES. Therefore, the CITES convention framework binds all these countries under one framework, and Afghanistan should use this

framework to help control the illegal exporting of the wild animals to the countries both neighboring and overseas.

Education, Capacity Building, Awareness, and Research

Education of communities, professionals, policymakers and others involved in natural resource management and conservation is a long-standing policy instrument (Cubbage et al, 2007). In this study, education, awareness, and capacity-building are found to be the second most important deterrents of illegal hunting. Most of respondents believed that increasing communities' and vendors' awareness regarding Afghanistan environmental law, endangered species lists, wildlife poaching, and illegal mark functions would help to decrease and halt wildlife poaching and illegal market activities.

Afghanistan Environmental Law fully discusses the role of education and research tools in managing nature conservation and wildlife. For example, Chapter 7, Article 64 of Afghanistan Environmental Law (2007) required NEPA, with coordination of related agencies, to prepare and implement a public awareness program to inform and educate people about natural resources and the value of protecting them. The education and public awareness programs that we propose would help local people, poachers, wildlife traders, vendors, airport check-in and check-out officers, city police, border police, and commandos in their decision-making processes, and would inform them that killing, poaching, and trafficking of Afghanistan's protected species are prohibited by Afghanistan and international laws. Most of

the residents and shopkeepers who are currently part of the market chain for poached wildlife do not exactly realize that their activities are illegal. This is because they lack sufficient information about Afghanistan's Environmental Law and Afghanistan's protected wildlife species. In addition, because wildlife from Afghanistan are illegally transported to neighboring countries through borders and exported overseas through airports, border police and airport officers should be well-trained and educated about Afghanistan's Environmental Law, especially about protected species. Training and workshops for local and city police officers should be prepared in order to increase their capacity and education about Afghanistan's protected species and illegal wildlife trade. As shown in the market chain diagram presented earlier, wildlife are transported from regional areas to provincial and national markets. Thus, police and airport investigation officers should understand that the transportation of these items and animals without CITES licenses is illegal; the transportation should be stopped, and the items and animals seized.

In addition to the measures proposed above, the NEPA should encourage researchers to perform research and create a baseline that can be updated with natural resources information. Article 66 of the Environmental Law required NEPA to promote national research programs as well as to cooperate with international agencies to conduct research and create methods for sustainable development. Now is the time to implement this policy.

Wildlife Compensation Program

The vote-counting meta-analysis and field survey results revealed that one of the main reasons for Afghanistan's wildlife poaching, especially among predators, is retaliation killing. We found that a significant number of wildlife species in Afghanistan, especially predators, are illegally hunted by local people for retaliation purposes. Livestock mortalities were primarily caused by harsh weather and environmental disaster; however, when livestock mortality was caused by wildlife predation the psychological impacts on livestock owners was found to be significant.

Based on this finding, we need to consider communities' psychological threats and launch a wildlife compensation program in the regions where high predator threats are recorded. A wildlife compensation program could pay farmers and herders if wildlife kills their livestock or damages their crops; or, the program could provide farmers and herders with facilities to protect their livestock and crops from the negative impacts of wildlife. This model has not yet been examined in Afghanistan (except one pilot project in Wakhan corridor), but it is necessary in provinces where human-wildlife conflicts are high.

The Wildlife Conservation Society (WCS)-Afghanistan program designed, for the first time, a livestock insurance program in Wakhan, Badakhshan (Simms et al, 2011). The WCS program provided a predator-proof corral, designed a wildlife compensation scheme, and developed a ranger-training program in order to decrease the predator threat rate. The program was very small in size and covered just a few villages of Wakhan, but it can serve as a good

model for decreasing the retaliation killing of predators. Improving this kind of program would help shepherds' livestock to stay safe and encourage communities to help the conservation wildlife program.

Providing Alternative Projects

Many people may seek direct and immediate solutions to the poaching problem, but the problem orientation model presented by Clark (2011) suggests that a problem cannot be completely solved without clarifying goals, describing trends, analyzing conditions, projecting trends, and finally selecting alternatives.

As Chapter 3 in this study reports, 17% of respondent stated that providing a livelihood alternative is the best way to fight poaching and illegal markets. Illegal wildlife trade and black market activities will not halt unless all stakeholders who are directly and indirectly involved in the process are taken under account. Communities that experience conflict among predators, poachers, venders, and national and international wildlife customers are the main stakeholders in the issue of Afghanistan's wildlife trade. Therefore, Afghanistan's government should consider alternative projects to deal with the illegal wildlife trade and black markets. For example, at present, wildlife products openly sell on Afghanistan's military bases, and members of the U.S. Army purchase the products and send home to the United States as gifts for their friends and families (Kretser et al, 2012). Besides wildlife products, Kretser et al. (2012) also noted that other non-wildlife made products such as carpets, hand-crafted jewelry, and antique guns were also available on the military bases. The availability of non-wildlife

products on the bases suggests that there is demand for those items too. Therefore, encouraging the substitution of non-wildlife products would be a good alternative for both venders and customers alike.

In conclusion, the Afghan government should consider all options to halt the illegal hunting and trade of wildlife, including national and international laws and regulations; education and research programs; and new alternative projects for reducing economic, social, and political risks factors. Such measures can encourage all stakeholders to adopt the environmental policies and regulations that can halt the black markets and help save Afghanistan's biodiversity from illegal trade.

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