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The Illegal Wildlife Trade

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Abstract and Keywords

The illegal wildlife trade is a growing problem driven by a number of factors (e.g. subsistence, alternative medicine, accessories, the pet trade). High demand for illicit wildlife products is threatening the existence of many of the most-endangered species. By unsustainably removing coveted species from the wild, communities that depend on such species for subsistence or eco-tourism will be adversely impacted by depleting populations. Laws and regulations have been implemented over the years, most notably CITES, to regulate the commercial trade in wildlife and prohibit trade in other species that are at-risk of overexploitation albeit with mixed success. Criminologists have recently entered the fold and provided insight to the wildlife trade through various perspectives. Researchers are beginning to better understand why and how the trade operates and what solutions might be implemented to reduce it. The article ends with implications for future research.

Keywords: wildlife crime, environmental criminology, green criminology, conservation criminology, poach, trafficking

Introduction

The illegal wildlife trade has long been a problem that only recently has captured the attention of the public and academics across disciplines. Criminologists and criminal justice scholars are increasingly researching the topic from a variety of perspectives with the aim of understanding the nature of the trade and how to mitigate it. Section I discusses the nature of the illegal wildlife trade and its impact on fauna and flora. An in-depth examination of international agreements and regulations is the focus of Section II. Section III examines the theoretical perspectives to understanding the illegal trade in wildlife. The types of offenders involved and the organization of the trade is detailed in Section IV. Section V identifies supply markets, or where poaching disproportionately occurs, along with where major demand markets are found. Section VI identifies the reasons why wildlife is trafficked and covers three commonly poached animals in the illegal wildlife trade—rhinos, pangolins, and parrots—in greater depth. The final section offers implications for future research.

I. Nature and History of the Problem

According to Interpol (2015), “Wildlife crime is the taking, trading, exploiting or possessing of the world’s wild flora and fauna in contravention of national and international laws.” Whether species are poached for subsistence (e.g., bushmeat) or personal ownership (e.g., ivory bangles), for local or international trade, cultural or religious beliefs, or as a result of human-animal conflict, a wildlife crime has occurred. Such a definition, however, does not cover “harms” to animals that may lead to diminished populations but is otherwise legal (also see Section III; White 2008). Such harms commonly come in the form of habitat loss (or deforestation), the practice of clearing a large number of trees for agricultural purposes or for human settlement (Geist and Lambin 2002). Deforestation is the primary threat of extinction for the majority of wildlife on earth because it removes suitable habitat for millions of species (Pimm and Raven 2000) and exacerbates climate change (MEA 2005). Because deforestation is commonly sanctioned by governments, it is not a crime in the traditional sense and will not be the focus of this systematic review.

For centuries, wildlife was taken from the wild for profit, personal use, or killed because they were a nuisance. Retaliatory killing of elephants, tigers, and lions, for example, has been a common practice in range states after attacking humans and/or their livestock (Omondi et al. 2004). Many of these actions were not against the law. Even in times or places where it was unlawful, it was often overlooked or ignored by law enforcement. In cases where animals were trapped or poached for profit, much of this trade was for local markets. As the world became more globalized in the latter decades of the 20th century, so too did the illegal wildlife trade. Species once poached for local or national demand are now trafficked through multiple countries and ports to reach markets on the other side of the world. Poachers may no longer be exclusively locals; outsiders are now sometimes involved in search of highly endangered and valuable species such as rhinos and elephants. Because of this international demand in combination with accelerated habitat loss, the illegal wildlife trade is significantly contributing to the decline of many species (Broad et al. 2003, Butchart et al 2010; Phelps et al. 2010; Sutherland et al. 2009), and in particular, a significant proportion of endangered species (Rosser and Mainka 2002). Some have claimed that we are currently experiencing the sixth mass extinction, where up to 100,000 species go extinct on an annual basis due to human-based activity (Barnosky et al. 2011; Ceballos et al. 2015).

Assessing the extent of the illegal wildlife trade is made difficult due to the clandestine nature of illicit activity. Economic estimates suggest the illegal wildlife trade, excluding the illegal timber trade and illegal fishing, is valued between US$7.8 and 10 billion a year (Haken 2011). The illegal fishing industry is estimated to be between US$10 and 23 billion a year (Agnew et al. 2008), and illegal timber is valued at US$7 billion a year (Haken 2011). Estimates such as these make the illegal wildlife trade one of the most

profitable illicit trafficking industries behind the trafficking of drugs, guns, and humans (Vince 2002).

The illicit trade has severe repercussions for both humans and wildlife. Unregulated taking of natural resources depletes resources for nations and the local communities that depend on them for their livelihoods (TRAFFIC 2008). The illegal wildlife trade also happens to have a high mortality rate due to the clandestine nature of trafficking live species (Cantu et al. 2007; Clark, Van Thai, and Phuong 2008; Franke and Telecky 2001). Often poachers take more than what isnecessary as there is an expectation that many wildlife individuals will perish en route to markets. Apart from the economic and population losses, poachers also damage the environments of species by using destructive practices such as felling trees (Gonzalez 2003), using cyanide to stun fish, and employing “blast fishing” (i.e., use dynamite) that causes coral degradation (McClellan et al. 2008).

Since at least the 1970s, there has been growing consensus that the wildlife crime problem needs to be addressed in the form of new policies, regulations, protected parks, enforcement, and public education. In addition to this, conservationist organizations, such as TRAFFIC, the World Wide Fund for Nature (WWF), and the International Union for Conservation of Nature (IUCN), have been at the forefront of protecting endangered species and their habitats while studying the global illegal wildlife trade problem in greater depth (see Schneider 2012). The following section examines regulations and laws put forth at the international and national levels.

II. Regulations and Laws

A. International Regulations

Despite the best intentions and efforts, combating the illegal wildlife trade effectively cannot fall upon a single nation in the world. Most wildlife is not endemic to one country, and wildlife often migrates across geopolitical boundaries. Criminals in the trade often facilitate this migration by poaching, trafficking, processing, and selling wildlife to consumers that span several countries and regions of the world. For these reasons, combating the illegal wildlife trade must be a coordinated effort that utilizes local, national, regional, and international cooperation (Schneider 2012; Pires and Moreto 2011; Moreto 2015).

A number of bilateral and multinational agreements have been put in place over the last century or so to conserve species in danger of extinction (Mitchell 2003; Schneider 2012). In the first half of the 20th century, such agreements, in addition to national legislation, restricted hunting and trading of wildlife in various ways. Many of these agreements and national regulations were unsuccessful in their objectives, which allowed unsustainable

wildlife poaching and trafficking to persist. For example, the International Agreement for the Regulation of Whaling signed in 1937 was seen as a failure because it did not impose size or catch limits (Schneider 2012).

The failure of national regulations and international agreements, along with the rise in the illegal wildlife trade of threatened species, instigated the 1973 drafting of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). This was subsequently put into effect in 1975 with 80 nations agreeing to regulate trade in wildlife and prohibit the trade of the most at-risk species from overexploitation. Since then, 181 nations have become part of the CITES agreement and have adopted CITES policies at the national level (Moyle 2003) through a licensing system that subjects certain wildlife to varying degrees of controls. To this day, CITES is considered to be the most effective international agreement in history in regulating the wildlife trade (Phelps et al. 2010; Huxley 2000; Schneider 2012).

CITES introduced three appendices in which listed species are afforded greater protection when traded between countries (see Table 1). Appendix I species are prohibited in international commercial trade because the trade may greatly impact these vulnerable species. The African elephant, cheetah, giant panda, tigers, and most rhino species are among the most notable species listed under Appendix I. Appendix II species are not always at-risk of extinction but can be at-risk without a system of regulations. Such species may be commercially traded only if export permits are procured, and depending on the import nation, may also require import permits. Appendix III is reserved for species that are requested to be listed and protected by a member nation so that other member nations avoid exploitation of said species (CITES 2015a).

Table 1 CITES Appendices and Restrictions on Trade

CITES Appendices	Restrictions on Trade	Number of Species Covered
CITES I	Species afforded greater protection because they are threatened with extinction. Species cannot be traded for commercial purposes. If they are traded, both import and export permits are required that demonstrate the trade “is not detrimental to their survival.”*	931
CITES II	Species may or may not be threatened with extinction, but the trade of such species needs to be highly regulated. Most species can be commercially traded with a required export permit.	34,419

CITES III	Species are protected in at least one country, and this country or set of countries has asked others to help regulate the trade to avoid overexploitation.	147

(*) According to CITES 2015c.

(**) CITES, 2015b.

The effectiveness of CITES trade controls on saving species from extinction is mixed. Many claim CITES is highly effective (e.g., Cole 2012; Fuchs 2010; Huxley 2000), but this is difficult to conclude in the absence of a systematic study examining the impact of listing species under CITES (Weber et al. 2015; Roe 2008; Martin 2000). The evidence available is restricted to species-specific studies and the impact CITES trade controls have at the macrolevel. From this, evidence has shown that trade bans, that is, listing species under Appendix I, have resulted in less trade and rebounding populations in some species such as the African elephant, vicunas, the southern white rhino, and the greater one-horned rhino (WWF 2015; Eloff and Lemieux 2014; Cole 2012; Lemieux and Clarke 2009; Mcallister et al. 2009). Often this success is in combination with conservation efforts on the ground (WWF 2015; Eloff and Lemieux 2014), and where it includes a recovery plan that calls for consultation with local communities and range states (Larriera et al. 2010; Lichtenstein 2009; Frisina and Tareen 2009; Mcallister et al. 2009; Hutton and Webb 2003; Leader-Williams 2003).

Critics of CITES actions suggest that declines are more common than recoveries for species listed under CITES (’t Sas-Rolfes 2010, 2012; Dickson 2003; Kievit 2000; Martin 2000; ERM 1996). Even when utilizing trade bans, populations do not automatically recover once commercial trade and poaching cease (Leader-Williams 2003; Jachmann 2003). A number of other factors, such as habitat loss and human-animal conflict, can impact population recoveries independent of the reduction in the illegal wildlife trade. In addition to these critiques, the complexity of demand and market dynamics is not always considered by CITES policymakers when implementing trade bans (Challender et al. 2015a; 2015b; Rosen and Smith 2010; Hall et al. 2008). This suggests trade bans, the most important tool CITES has in its arsenal to combat the illegal wildlife trade, may be an overly simplistic response to a very complex problem (Bowman 2013; Briggs et al. 2013; Couzens 2013; Moore 2011a; Cooney and Jepson 2006; Dickson 2003; Moyle 2003). Because of the possible overuse of trade bans in the absence of viable conservation policies on the ground, endangered species may not recover from dwindling populations, which has been the case with tigers (Project Tiger 2005) and pangolins (Pantel and Chin 2009) in particular. Overall, trade bans have the potential to be a useful tool in the short-term but may lead to poaching and wildlife trafficking in the long-term if no other strategies are implemented (Hutton and Webb 2003; Conrad 2012).

CITES has the ability to save some species from extinction and protect others from being at-risk, however, the success of CITES is contingent on a number of working parts that may be lacking or failing altogether. *First*, the lack of enforcement and compliance of CITES objectives at the national and local levels has hindered its overall effectiveness (Han 2014; Schneider 2012; Rosen and Smith 2010; Leader-Williams 2003; Vasquez 2003). This lack of enforcement and compliance disproportionately occurs on the continent of Africa where many of the most biodiverse regions of the world are. Noncompliance and enforcement problems in Africa are due to a myriad of problems that include (1) corruption, (2) wars, (3) limited resources, (4) lack of political commitment and stability, and (5) domestic conflict (Schneider 2012; Fiadjoe 2004). *Second*, evaluating whether CITES policies are effective is difficult given data limitations. For example, population counts are not collected for many threatened species that are listed under CITES (Abensperg-Traun et al. 2009; Phelps et al. 2010; Parsons et al. 2010). *Third*, trade bans may increase black market prices for threatened and endangered species, which can exacerbate poaching (MacMillan and Han 2011; Pires and Moreto 2011; Hall et al. 2008; Courchamp et al. 2006; ’t Sas-Rolfes 2000). *Fourth*, locals may not be incentivized to preserve wildlife when the ability to legally trade them is removed. Some suggest that people only value and protect wildlife if they can benefit from using it (Dickson 2003; Leader-Williams 2003; Martin 2000). *Finally*, CITES is limited because it is designed to address only the illegal *international* trade in wildlife and not *intranational* trade. Recent research shows the domestic trade in illegal wildlife is quite substantial (Pires 2012; Pires and Moreto 2011; Nijman 2010; Tilson et al. 2010; Du Plessis 2000) and may even be larger than the international trade for some species (see also Section VI).

B. National Regulations

Typically nations will either impose poaching (and trade) bans for all species of a particular animal or regulate the trade in the form of catch-quotas. Catch-quotas allow a certain number of species to be trapped every year as long as appropriate permits have been obtained. The lobster industry, for example, illustrates this scheme quite well: fishermen are required to obtain permits and/or licenses to trap lobsters during particular times of the year and are restricted by catch limits and size. The purpose of such a regulatory scheme is to allow certain members of the community to profit from historical practices while ensuring species' populations are healthy. Ideally, catch-quotas are based on scientific assessments of populations so that legal trapping, or catches, of wildlife are sustainably based, but this may not always be the case (Cantu et al. 2007).

To date, no systematic study has analyzed the effects of either poaching bans or catch-quota regulations on species' populations (Smith and Walpole 2005). One recent study suggests that export quotas of birds had no influence on the domestic bird trade in a neo-tropical country (Daut et al. 2015). However, other parrot-trade-related studies have found catch-quotas can lead to overtrapping due to lack of enforcement (Cantu et al. 2007; Gastanaga et al. 2011). There is similarly mixed evidence regarding the effectiveness of poaching bans. Many of the most-endangered and trafficked species have habitats in nations with total poaching and trade bans. Clearly, a systematic review or meta-analysis study is needed to shed light on which approach is better at diminishing the risk of extinction in species at the national level.

III. Theoretical Perspectives to Understanding the Illegal Wildlife Trade

We now shift our attention to discussing the criminological and criminal justice perspectives that have been used to examine illegal wildlife trafficking and related wildlife crime (e.g., poaching). For ease, we focus on the four main perspectives that have dominated the literature: environmental criminology and crime science, green criminology, conservation criminology, and criminal justice. However, it is worth noting that scholars have used other criminological perspectives to examine wildlife crimes that go beyond the following (e.g. techniques of neutralization, differential association theory, etc.; see Eliason 1999; Eliason and Dodder 1999).

A. Environmental Criminology and Crime Science

Although, the term “environmental criminology” has also been used to specifically describe the study of crimes against the environment (White 2008), in order to avoid confusion (see Brisman and South 2013; Herbig 2014), we adhere to the original and traditional conceptualization and use of environmental criminology. With its roots in crime prevention (Andresen 2014), environmental criminology is made up of established theoretical frameworks, including the routine activity approach, geometric theory of crime, rational choice perspective, and pattern theory. In a similar vein, crime science is a multidisciplinary applied action-research perspective that is outcome focused and based on understanding the “how” of crime as opposed to the “why” in order to develop preventative strategies for immediate crime reduction (Clarke 2004; Laycock 2005).

Research over the years has consistently shown crime disproportionately occurs as it relates to target selection (Cornish and Clarke 1986), space (Sherman et al. 1989), time (Felson and Poulsen, 2003), and products (Clarke 1999). By knowing how crime is concentrated, opportunity-mitigating strategies can be implemented to have immediate crime reduction effects. Arguably, one of the most widely known crime prevention strategies is situational crime prevention (Clarke 1980, 1997, 2009), which aims to alter the immediate environment for a specific crime type in order to increase the effort and risk for crime commission, while also reducing or removing rewards, provocations, and excuses.

To date, a number of studies have been conducted on the illegal wildlife trade from an environmental criminology and crime science perspective. For example, the routine activities approach (Cohen and Felson 1979) has been used to examine wildlife poaching in protected areas in South Africa (Herbig 2011) and trophy poaching in Montana in the United States (Eliason 2012). Recently, Moreto and Lemieux (2015b) extended the routine activity framework to incorporate the existence and role of proxy offenders (i.e., wire snares initiating contact with wildlife as opposed to poachers) in their research of poaching in Uganda.

Crime scripts, also known as the procedural analysis of offending, which attempts to generate and organize the procedural activities and requirements of crime commission (Cornish, 1994), has been used to examine wildlife trafficking (Lavorgna 2014; although see Moreto and Clarke 2013). Additionally, the concept of “hot products,” or products that are “most attractive to thieves” (Clarke 1999: 1), and the related conceptual CRAVED framework (concealable, removable, available, valuable, enjoyable, and disposable) has been applied to several wildlife crimes, including parrot poaching (Pires and Clarke 2011, 2012), parrot trafficking (Pires and Petrossian 2016), illegal fishing (Petrossian and Clarke 2014), and livestock theft (Sidebottom 2013). With respect to the illegal wildlife trade, Moreto and Lemieux (2015a) recently argued that the CRAVED model may be limited in fully assessing the dynamic nature of some wildlife products as they maneuver

through an illegal market continuum. They therefore proposed an extended model referred to as CAPTURED (concealable, available, processable, transferrable, useable, removable, enjoyable, and desirable).

Lastly, crime reduction and prevention frameworks have also been introduced within the scope of wildlife crimes, especially situational crime prevention (Petrossian et al. 2016; Lemieux 2014; Pires and Moreto 2011). For instance, the situational crime prevention framework has been used to investigate the impact of the international ban on ivory sales on elephant poaching in Africa (Lemieux and Clarke 2009) and illegal fishing (Petrossian 2015). Additionally, the market reduction strategy, which was initially conceived to reduce and disrupt stolen goods markets, has also been discussed within the scope of wildlife trafficking (Schneider 2008).

B. Green Criminology

Considered to be within the "margins of criminological research [and a] distinctive subfield that challenges traditional approaches in criminological inquiry" (Wyatt 2013: 13), green criminology originally developed as an extension of radical criminology. In essence, green criminology was proposed as a means to investigate the underlying and overreaching political economic origins of environment-related criminal activity (Stretesky, Long, and Lynch 2013). From this perspective, it is argued that the causes of environmental harms are similar to factors that result in social injustice in that inequalities associated with gender, race, and class result in harms against both humans and the environment. In other words, environmental and social injustice is perpetuated by established power dynamics and by those who control the means of production (White 2008; Stretesky et al. 2013).

While some green criminologists still operate from a political economy perspective, including more recently in relation to the role of the treadmill of production and ecological disorganization on environmental crimes (Lynch et al. 2013; Stretesky et al. 2013), green criminology has been expanded to better account for "environmental justice, with a special focus on human rights and social equity; and ecological justice, with a special focus on the biosphere generally and the rights of non-human as well as human" (White 2008: 50). Notably, most of those who adhere to a green criminological viewpoint argue that solely focusing on criminal violations is too restrictive and that a harm perspective is needed to account for activities that cause significant environmental destruction but may fall outside the purview of criminal law (Lynch and Stretesky 2003; White 2008). As such, it has been argued that the broad scope and purpose of green criminology is to

> provide a space within criminology to examine the nexus between environmental problems, the definition of harms against nature as crimes, the need to reconsider criminal justice practices and policies in relationship to the environmental harms

> they produce, the variety of victims environmental offenses create … and the effect of environmental toxins on ecological systems and species' health and behavior.
>
> (Lynch and Stretesky 2014: 2)

Acknowledging the importance of environmental harms, green criminologists also recognize the importance of distinguishing between different levels of eco-justice, including environmental justice (i.e., emphasis on human well-being), ecological justice (i.e., focus on investigating human interaction with the environment as it relates to harms and risks), and species justice (i.e., consideration of the welfare and rights of nonhuman animals) (White 2008; White and Heckenberg 2014). Additionally, green criminologists have also proposed the importance of developing a nonspeciesist perspective (Beirne 1999), exploring the link between cultural meanings and perspectives as it relates to environment-related crimes (Brisman and South 2013) and linkages between environmental harm and racial and socioeconomic inequalities (Brisman 2015). Moreover, the transnational nature of environmental crimes/harms has been recognized within the promotion of an eco-global criminology framework (White 2011). With reference to wildlife trafficking, a green criminological perspective has been used to examine the trade in Vietnam (Ngoc and Wyatt 2013) and in Russia (Wyatt 2009).

C. Conservation Criminology

Partly in response to some of the criticisms and limitations levied against green criminology (see Halsey 2004 for example), Gibbs and colleagues (2010) introduced conservation criminology as an interdisciplinary conceptual framework that integrates criminology, natural science disciplines, and risk and decision science. Similar to green criminology, conservation criminology recognizes the importance of examining behaviors that do not violate criminal law, however, conservation criminologists "reject previous definitions and typologies of conservation crime" that can be found within the green criminological literature that emphasized social justice and biocentric perspectives (Gibbs et al. 2010: 129).

The primary starting point for conservation criminologists is to determine and ascertain the manifestation and level of environmental risk from the perspectives of different stakeholders. By focusing on risk, as opposed to crime for example, it is argued that the inclusion of different perspectives can be attained, potential consequences can be better articulated, and different solutions can be developed. Conservation criminology also operates from multiple scales (e.g., individual to collective) and domains (e.g., local to global) thereby providing a comprehensive examination of environmental risks, both direct and indirect (Gibbs et al. 2010).

In addition to incorporating risk and decision sciences, conservation criminology explicitly integrates the natural science disciplines in order to better understand and respond to environmental crimes. Given the expansive scope of environment-related crimes and the overall lack of familiarity of criminologists or criminal justice scholars in measuring, managing, and conserving natural ecosystems, it is argued that natural science disciplines have a very important role in examining environmental crimes. As put by Gibbs and colleagues (2010):

> Criminologists are knowledgeable about the legal system, but are not trained to scientifically assess threats to the natural environment. Thus, criminologists could provide information on the circumstances under which legal versus other tools may be most effective while natural resource scientists offer insight into the impact of various stimuli on natural resources and ecosystems. (133)

By incorporating three distinct disciplines, conservation criminology therefore "offers a model for understanding this type of illicit human behavior (environmental crimes) and the emotions, cognitions, and institutions that affect human relations with the environment" (Gore 2011: 659). Within the scope of wildlife crimes, conservation criminologists have examined poaching risks (Kahler, Roloff, and Gore 2013) and noncompliance with poaching laws (Kahler and Gore 2012) in Namibia.

D. Criminal Justice Perspectives

In addition to criminologists, criminal justice scholars have provided important contributions to the study of wildlife crimes, particularly within the scope of wildlife law enforcement. Not only has this research provided insight into better understand the human dimensions of conservation policy (Jacobson and Duff 1998; Gore 2011) and central aspects of wildlife law enforcement (see Forsyth 1993; Eliason 2003, 2006; Shelley and Crow 2009; Patten 2010; Warchol and Kapla 2012; Moreto 2015; Moreto, Brunson, and Braga 2015, Forthcoming), but such frontline perspectives have been vital for research on wildlife crime as well, including the development of poaching typologies (Forsyth, Gramling, and Wooddell 1998; Eliason 2008). Moreover, such research has provided valuable insight into conditions that may contribute to the development and continuance of wildlife crimes, such as ranger deviance (Moreto et al. 2015).

IV. Actors in the Trade

A. The Market Continuum from an Actor-based Perspective

The number of individuals required for a wildlife product to maneuver through a market will vary and depend on a number of factors, including the expected end market and anticipated consumer, the unique characteristics of the products, and the capabilities and limitations of actors already involved in the trade. While the illegal wildlife trade can be examined in various ways, including a stage-based (Tailby and Gant 2002) or a product-based approach (Moreto and Lemieux 2015a), we focus our attention on the actors in the trade, in part because the emphasis in the literature is on the individuals involved. Indeed, “the journey of any given wildlife product from the collector at the source to the final consumer can involve a wide range of intermediaries and other stakeholders” (Broad et al. 2003: 15). It is important to note that the following categories are not mutually exclusive and that individuals may fulfill multiple roles throughout the trade. Furthermore, we explicitly refer to these individuals as actors as opposed to offenders given the potential conceptual overlap between offender/victim as it pertains to broader societal changes and cultural pressures (i.e., legal hunting deemed illegal; see Wyatt 2013).

B. Poachers

In comparison to other actors involved in the illegal wildlife trade, poachers have received the most empirical attention. Research suggests that poachers vary; they are influenced by different motivations and motives, utilize different techniques, and can use a variety of equipment. As evidenced in the literature, different wildlife species may be targeted for different reasons and therefore, specific techniques may be preferred over others. For example, if a tiger is targeted for its skin, poison may be used instead of

hunting techniques that may damage the pelt (e.g., guns). Broadly speaking, research suggests that poachers are driven to poach because of necessity/subsistence, profit/commercial, traditional or cultural practices, religious beliefs, boredom, protection of self and property, rebellion, thrill killing, trophy hunting, research, zoos, exploitation of legal hunting practices, and gamesmanship (Muth and Bowe 1998; McMullan and Perrier 2002; Raymakers 2002; Tailby and Gant 2002; Zimmerman 2003; Shepherd and Magnus 2004; Bell, Hampshire, and Topalidou 2007; Ahmed 2010; Wilson-Wilde 2010; Wyatt 2013; Moreto and Lemieux 2015b; von Essen et al. 2014).

C. Middlemen/Traders

In wildlife trafficking, Wyatt (2013) argues that middlemen are akin to a "fence [or] someone who moves stolen goods within networks" (87). Middlemen are involved in brokering transactions between different parties, acting as wholesalers, and when necessary, keeping in storage illegal wildlife contraband (Broad, Mulliken, and Roe 2003). Often middlemen are locals (Broad et al. 2003; WWF 2012) who may be trading due to their familiarity with the underground trade or individuals with a vested interest in specific products; however, within the scope of organized crime groups (discussed later), middlemen may simply be an extension of a larger trafficking operation, albeit one that is based more on loose networks rather than a hierarchical one (Wyatt 2013).

D. Processors

As mentioned earlier, prior research suggests that the characteristics of wildlife products should be taken into consideration when investigating the entirety of an illegal trade. For example, a poached tiger can be redistributed via the illegal market in several ways: from a live pet to different products used for traditional Asian medicine (TAM). Both a live tiger and tiger parts will require individuals who are familiar with specialized knowledge and techniques. In other words, wildlife may need to be modified to ensure that it is a "saleable product" (Wyatt 2013: 6), or, more broadly, the "alteration, refinement, or conversion of a product's form or status" (Moreto and Lemieux 2015a: 311) may need to be performed for the product to successfully move along the trade. Notably, the latter definition recognizes that the illegal wildlife trade is not simply based on monetary transactions; it may involve customary or traditional practices and is therefore wider in definition. Moreover, this definition explicitly highlights how the physical form of a product can be changed as well as its legal or regulatory status. The reality that some wildlife products may need to be processed demonstrates how the product also dictates who needs to be involved in the trade. For example, unique skills are required to successfully convert raw ivory into decorative items (Vira et al. 2014) and sturgeon roe into caviar (Saffron 2002).

E. Transporters

Transporters are responsible for transporting the wildlife product to its next destination in the market chain. Given the variability in both domestic and transnational forms of wildlife trafficking, transporters can operate within countries and across borders (Wyatt 2013). At times referred to as “mules” (IFAW 2013), transporters can travel using a variety of transportation modes and use a number of techniques for concealing wildlife products. For example, transporters have attempted to smuggle wildlife on their persons and through luggage. Notably, not all transporters may realize that they are participating in the illegal wildlife trade. For instance, legitimate shipping companies may be transporting wildlife products unknowingly due to the sheer number of consignments. Indeed, it has been argued that “transportation is the backbone of global trade, and traffickers in wild animals and wildlife products rely heavily on logistics, land, air and sea carriers to smuggle illicit goods” (TRAFFIC 2015).

F. Sellers

Those involved in selling illegal wildlife products vary significantly—from those working in local markets to well-established, legitimate collectors organizations. For example, an individual who works in a local market may sell captured live animals in addition to other goods (Leberatto 2016), while (illegal) caviar may only be sold by trusted sellers to extravagant restaurants (Saffron 2002).

In addition to physical markets, the expansion and use of the Internet has contributed to the development of the illegal wildlife trade (Laufer 2010). Despite increased awareness and vigilance by some online companies, the proliferation of illegal wildlife products continues on the Internet (e.g., Hastie and McCrea-Steele 2014). Moreover, it is believed that the existence of the “dark web” provides another avenue for sellers to interact with would-be buyers (Khan 2013).

G. Organized Crime, Terrorist, and Rebel Groups

The belief that organized crime syndicates are directly involved in the illegal wildlife trade is fueled by the high profits associated with specific wildlife products (e.g., ivory, rhino horn) and the ability to utilize established criminal networks and personnel, smuggling routes, and resources to entice corrupt officials (Zimmerman 2003; Elliot 2012; IFAW 2013). Media accounts further add fodder to the belief that organized crime syndicates are actively engaged in wildlife trafficking (Morelle 2014). However, the extent of organized crime groups involvment in the illegal wildlife trade is still up for debate. While some scholars have noted the existence of organized crime groups in particular stages (Wyatt 2009) or for specific species (Warchol 2004), others have found little or no evidence suggesting that organized crime syndicates are involved in the illegal

wildlife trade (Leberratto 2016; Pires et al. 2015). Factoring in what is currently known about the role of organized crime in the illegal wildlife trade, it is sensible to state that more research is required, especially from a species- or product-specific perspective (see Moreto and Lemieux 2015a). Moreover, it is important to note that the level of organization required for a trade to operate does not equate to the overall trade being within the stronghold of organized crime groups. While organized crime may be present at certain stages of the illegal wildlife crime and organized-crime indicators may be present (see Sellar, 2007), it does not seem to be evident at *all* stages of the trade.

Finally, anecdotal evidence suggests that terrorist and rebel groups may also be involved in wildlife trafficking (Neme 2009; WWF 2012). It is believed that such groups hunt, trade, and smuggle wildlife products to fund their operations (Lawson and Vines 2014). For example, in 2013, the UN Secretary-General's report emphasized the potential role that the Lord's Resistance Army may have in elephant poaching and the illegal ivory market.[1]

H. Consumers

The consumers of the illegal wildlife market are quite diverse and include those who seek wildlife products for cultural medicines and traditions, luxurious clothing, textiles, food delicacies, and exotic pets. Although much of the literature tends to focus on the transnational nature of the illegal wildlife trade, it is important to note that local individuals can also be consumers, and, in some instances, the local underground market may be significant, as is the case for illegal caviar in Russia (see http://assets.panda.org/downloads/Sturgeon_factsheet.pdf).

V. Supply Markets, Transit Countries, and Demand Markets

Similar to the actors, the supply and demand markets will vary among the different wildlife products. In general, however, it is believed that both the legal and illegal wildlife market flow from emerging to developed countries (Reeve 2002; Roe et al. 2002; Duffy 2010; Rosen and Smith 2010; Lawson and Vines 2014). Open-air illicit markets are typically found in cities large and small throughout biodiverse regions, such as Latin America, Africa, and Southeast Asia, where an abundance of wildlife is for sale. Locals and indigenous people, often from impoverished communities, have historically trapped and traded (or poached and trafficked) wildlife to supply such markets and supplement their incomes (Leberatto, 2016; Pires et al. 2016; Roe, 2002; TRAFFIC, 2008). From the demand perspective, the main destination areas are believed to be China, the United States, and the European Union (Wyatt 2013). However, this will also differ based on the mode of transaction (e.g., Internet), which further highlights the challenges in

generalizing the illegal market. Lastly, due to their geographical location, lax laws, and number of available ports of entry, several countries are considered to be transit countries. For instance, the illegal trade in both ivory and rhino horn have demonstrated several transit countries within the overall market (Milliken 2014).

VI. Types of Wildlife Trafficking and Commonly Trafficked Wildlife

Wildlife is poached and trafficked for a number of reasons, which include alternative medicines, accessories or luxury items, bushmeat, and the live pet trade. Poaching and trafficking wildlife for their supposed medicinal qualities, otherwise known as traditional Asian medicines (TAM), is one of the largest contributors to the animal parts trade both in terms of volume and species affected. For example, animal parts, such as tiger bones and genitals, bear gallbladders, deer fetuses, elephant skins and other parts, antelope horns, rhino horns, pipehorses, and snakes are trafficked for use in TAMs (Martin-Smith et al. 2003; Li and Wang 1999). Wild birds, shark fins, bear paws, and dried abalone are trafficked as a delicacy in Asia and Europe (Shepherd and Shepherd 2010; Forero 2006; Papp 2008; To et al. 2006). Other animal parts, such as skins (e.g., leopards, crocodiles) and scales (e.g., pangolins) are used as wearing apparel (Hutton and Webb 2003; Bräutigam et. al. 1994); while elephant ivory is used to make pendants, necklaces, rings, and other fashion accessories (Martin and Vigne 2011; Martin and Stiles 2004). Finally, wild animals, such as parrots, tortoises, and macaques, are traded live as pets (Broad et al. 2003; van Lavieren 2008) and are sold to private collectors as well as circuses (Burgener 2002; Speart 1993, as cited in Warchol et al. 2003). The plowshare tortoise, for example, is the most-sought animal in the world for the live pet trade in part because of its extreme rarity. One plowshare tortoise can sell upward of US$100,000 (IUCN, 2015a; Finnegan, 2012) as a consequence of so few remaining in the world.

A great variety of species are routinely poached and trafficked, but some much more often than others. Of the studies that have examined poaching variation among wildlife, they have all found an unequal distribution of poaching. That is, some species are highly poached and trafficked while others are not (Petrossian et al. 2016; Petrossian and Clarke 2014; Pires and Clarke 2012; Nijman, 2010; Robbins 2003). The distribution of poached species appears to resemble the 80-20 rule (Clarke and Eck 2005), in that a small percentage of the world’s species account for a great majority of total poaching. For example, only a few groups of wildlife, namely mammals and reptiles, account for the great share of wildlife seized entering the United States (Petrossian et al. 2016). The following section will focus on the most commonly poached animals that have garnered the most attention from conservationists and policymakers either because they have experienced a rapid population decline or are on the brink of extinction.

A. Rhinos

Once widely abundant and dispersed, rhino populations currently number only in the thousands and are only found in protected parks in a few Asian and African countries (see www.savetherhino.org). Five species of rhino remain today, three of which are critically endangered, and the remaining two are vulnerable and near threatened (IUCN 2015b). While there are several threats rhinos face, poaching is the most serious among them. Rhinos are presently one of the most hunted animals on the planet for their rhino horn, and this is predominantly occurring in South Africa, where the largest population of rhinos exist (www.savetherhino.org). The main demand markets for rhino horn are China and Vietnam (Beech and Perry 2011; TRAFFIC 1997; Wilson-Wilde 2010), where people believe rhino horn can cure a variety of ailments, which recently includes cancer (Moore 2011b; Wilson-Wilde 2010). Evidence, however, casts doubt on whether rhino horn ameliorates any ailments (Nowell 2012; Moore 2011b). In addition to using horn for TAM, wealthy individuals in Asia acquire it simply to show status (Mander 2012). Rhino horn is also used for *jambiya* dagger handles in Yemen (www.savetherhino.org).

Rhino horn cannot be commercially traded in international markets since CITES outlawed it in 1977. As a result of this and conservation efforts on the ground, the white rhino and the greater one-horned rhino experienced incredible growth during the following three decades. Until 2008, rhino poaching was relatively rare in South Africa with an average of 15 losses per year (Eloff and Lemieux 2014). In 2008, however, poaching escalated to 83 losses and has increased every year since. By 2014, 1,215 rhinos were poached in South Africa alone (www.savetherhino.org). With diminishing populations and a growing demand from Vietnam, the price of rhino horn has increased dramatically. Rhino horn was recently valued at US$35,000–$60,000 per kilo (Eustace 2011; Mander 2012; Moore 2011b), making the average rhino horn (2.5 kilos) (Stoddard 2012) cost between US$87,500 and $150,000. Rhino horn is now worth more than elephant ivory or any other animal part in the world.

Given its current price in international markets, there is a tremendous incentive to be involved in either poaching, trafficking, or selling rhino horn to consumers (Eloff and Lemieux 2014). According to Jackson (2012), there are four types of poachers: subsistence, commercial, skilled, and chemical. The least skilled are subsistence poachers, who are generally poor locals who often use snares and machetes to trap and kill rhinos (Eloff and Lemieux 2014). Commercial poachers are suspected of being the most common, and they largely account for the drastic increase in poaching in South Africa since 2008. They are more likely to use high-powered guns and work in teams of four to six individuals with military backgrounds. Once the rhino is killed, they can quickly dispose of the horn to middlemen. Skilled poachers are far more sophisticated and will often kill rhinos with one shot. They will quickly remove the horn and exit the area before rangers are aware of the loss. Finally, chemical poachers use tranquilizer darts to sedate rhinos, which sometimes emanates from a helicopter. While a highly

sophisticated form of removing rhino horn, it is relatively rare compared to commercial poaching (Jackson 2012; www.stoprhinopoaching.com).

Apart from poaching rhinos, there are other ways that rhino horn is obtained to supply demand markets in Asia. “The very people responsible for ‘protecting’ rhinos are sometimes exploiting their professional networks and unrestricted access to the animals to earn large sums of money” (Eloff and Lemieux 2014: 21). This can take the form of pseudo-conservation (e.g., mismanaging rhino horn stockpiles) or pseudo-hunting[2]—both have become increasingly common in South Africa (Ayling 2013; Milliken and Shaw 2012; Beech and Perry 2011; Eloff and Lemieux 2014). In addition to these two methods, stealing horns from museums, safari lodges, game reserves, and taxidermies has become more commonplace (Milliken and Shaw 2012).

A number of initiatives can be implemented to reduce the likelihood of rhino poaching. A recent study found that rhino poaching is spatially concentrated within Kruger National Park in South Africa and that it occurs more often near roads and the Mozambique border (Eloff and Lemieux 2014). Eloff and Lemieux (2014) suggest a number of solutions, particularly technologically savvy ones (e.g., remote sensing, gunshot detectors, unmanned aerial systems or drones) that can alert rangers to where suspicious activity is occurring in real-time thereby *increasing the risk* of apprehension of offenders. On the prevention side, Eloff and Lemieux (2014) recommend controlling access to parks so that there only a few ways in or out of the park. Authorities can also digitally record license plate numbers of cars and visitor identification information to deter poachers from using vehicles. Lastly, routine vehicle searches at park exits can be conducted to look for rhino horn. In addition to these recommendations, more needs to be done about reducing demand for rhino horn. Public education campaigns aimed at the Chinese and Vietnamese people could theoretically reduce demand by alerting them to the extinction risk of rhinos and the lack of medicinal benefits from rhino horn ingestion.

B. Pangolins

Pangolins, also known as scaly anteaters, are mammals (Nowak and Paradiso 1983) that play an important ecological role by feeding on ants, termites, and the like. While pangolins do not receive as much media attention as overexploited photogenic species, they are among the most poached mammals in the world (Sutter 2014). About 100,000 to 135,000 pangolins per year are needed to meet the demand in China, which is the largest demand market in the world (Shibao, Guangzhi, and Qianxiang 2005). China has had a long history of using pangolin for consumption and as a traditional Chinese medicine (TCM) (Pantel and Chin 2009; Shepherd 2009; Wu et al. 2004). Pangolin scales are believed to be an important ingredient for treating a variety of ailments (Yue 2009; Acosta-Lagrada 2008; Phalla 2008; Wang 2008) and are also used to make leather accessories (Phalla 2008). As a result of this unsustainable demand, pangolins are commercially extinct in the wild in China (Wu et al. 2004). China’s neighbors have also

been depleted of their pangolin population with the supply currently coming from Indonesia and Malaysia (Semiadi, Darnaedi, and Arief 2008).

There are eight different species of pangolin worldwide, four located in Southeast Asia and four located in Africa. The two most commonly traded pangolin species in Asia are the *Manis javanica* and *Manis pentadactyla*, and both species are listed as "critically endangered" by the IUCN (2015b). The other two Asian species of pangolins—*Manis culionensis* and *Manis crassicaudata*—are considered "endangered." In Africa, all four pangolin species, *Smutsia temminckii, Phataginus tricuspis, Uromanis tetradactyla*, and *Smutsia gigantea*, are classified as "vulnerable." The African species' decline is attributed to bushmeat exploitation and the exportation of pangolin meat and scales used for TCM in Asia (IUCN 2015b). While the African pangolin species are commonly poached, they may be less endangered than their counterpart Asian species for a number of reasons. Trafficking pangolins from Africa to China is not easy, especially if they are alive. There is some difficulty in trafficking live pangolins far distances as they are very hard to keep in captivity and are easily detected. Live pangolins often die in transit to their destination market due to disease and unsanitary conditions (Clark, Van Thai, and Phuong 2008). Additionally, the Chinese demand is generally supplied with pangolins and their byproducts from neighboring countries because the distance between supply and demand markets is much closer and thereby easier.

The price increase of pangolins over time is directly related to their declining population in the wild, making it difficult to disincentivize hunters from poaching. A study conducted in China revealed that prices are 100 times higher than those in the early 1980s and 20 times higher than in the 1990s (Challender et al. 2015a; Shibao et al. 2005). A kilogram of pangolin scales will now sell for around US$199 (Guilford 2014). Served as meat, one pangolin can sell for upward of US$1,000 (Allgood 2013), which can demonstrate a person's socioeconomic status.

Pangolins are exceptionally vulnerable to overexploitation because they have a very slow reproduction rate, do not breed easily in captivity (Lim and Ng 2007; Shepard 2009), and are easily hunted. Pangolins main defense against predators is to roll up in a ball, which is highly effective when encroached by a nonhuman predator, but highly ineffective against humans (Lekagul and McNeely 1977; Pantel and Awang Anak 2010). Once a hunter finds a pangolin, no real effort or skill is required to capture them. Various poaching methods are used to capture pangolins and are contingent on the country's landscape and the species being hunted, as some species are arboreal and others are terrestrial. Hunters find pangolins through six common techniques: trained dogs, tracking strategies, pangolin-specific traps, nonselective traps, spotlights, and opportunistic encounters (Newton et al. 2008). Opportunistic encounters come in the form of hunters stumbling upon the opportunity to capture a pangolin while hunting other animals or cutting down a tree for firewood (Sterling, Hurley and Le 2006).

All Southeast Asian countries already have laws in place that make hunting pangolins illegal. Additionally, all Asian species are listed under Appendix II of CITES and have a zero trade quota (Challender et al. 2015b; Kang and Phipps 2003). Antipoaching laws and international treaties have done little to thwart the trade in pangolins—most species are in danger of becoming extinct. The incentive to poach and traffic pangolins will be difficult to eradicate or reduce as the ever increasing price per kilo only further incentivizes poaching. A number of solutions that target both the demand- and supply-sides of the equation can theoretically reduce the trade. Reducing demand can come in the form of public education campaigns in China and other Southeast Asian countries where demand is the greatest. Also, medicinal alternatives to pangolin scales can be provided in the form of dry seeds of cowherb, known as *Wang Bu Liu Xing*, which has the same effectiveness (Wang 2008). On the supply side, law enforcement can make it more difficult to poach and traffic pangolins by targeting hot areas (i.e., forests, roads, borders, ports) where pangolin poaching and trafficking disproportionately occur. One study found that setting up road stops on a major road used for trafficking pangolins and other wildlife led to a considerable seizure amount (Lee et al. 2005). Unfortunately, research on hot spots related to the illicit pangolin trade has been largely ignored, and this is where future research could aid law enforcement strategies in thwarting the trade.

C. Parrots

Unlike other commonly poached animals, parrots are among the few that are poached live for the pet trade. Wild parrots are found throughout most regions of the world but are more typical in areas with warmer climates. While their presence is vast, parrot poaching disproportionately occurs in Central and South America, otherwise known as the neotropics. Historically, parrots have been taken from the wild in the neotropics laws permitting or not. Parrot poaching was largely committed for personal ownership or for local sale (Cantu et al. 2007). Such practices did not push many species to the brink of extinction, because it was limited in scope and parrots were far more abundant in prior decades and centuries. It was not until the 1970s that poaching became an industrialized enterprise in large part to the demand from the United States and European nations (Pires and Clarke 2012; Cantu et al. 2007). Once the illegal parrot trade became a global phenomenon, coupled with deforestation, parrot populations began to rapidly decline for a great many species (Clarke and Rolf 2013; Juniper and Parr 1998; Howell and Webb 1995), making parrots one of the most-endangered group of birds on the planet (Cockle et al. 2007; Pain et al. 2006; Wright et al. 2001).

By the end of the 20th century, CITES banned the trade of most parrot species and the United States banned the importation of wild parrots (Armstrong et al. 2001). Ostensibly, this resulted in a large decline in the illegal parrot trade at the international level (Cooney and Jepson 2006; Wright et al. 2001). Recent studies, however, have shown that the domestic trade in parrots is a far greater problem than the international trade. A Mexican report based on interviews with trappers (Cantu et al. 2007) found upward of 78,500 parrots were being poached annually and the vast majority were for domestic demand. Three separate market surveys in Bolivia (Herrera and Hennessey 2007), in Peru (Gastanaga et al. 2011), and in Brazil (Regueira and Bernard 2012) found similar results in terms of the volume and the domestic nature of the trade. Such evidence suggests that demand for pet ownership of parrots within neotropical countries is very high (Weston and Memon 2009; Cantu et al. 2007; Gonzalez 2003), and current poaching levels are unsustainable for the great majority of species in these countries (Gastanaga et al. 2011; Pires 2012; Cantu et al. 2007).

While a majority of species are affected by the illegal parrot trade, some are more affected than others. Recent criminological research has applied the theft variation model, CRAVED (Clarke 1999), to understand why poaching variation exists among the more than 330 parrot species in the world. The conventional wisdom in the field of conservation was that parrot species that are disproportionately poached would be the most attractive, valuable, and/or rare. Such thinking insinuates that poachers will target a particular type of species based on profitability and/or their perception of consumer demand (Pires and Clarke 2012). While offenders might seek such species in the wild, they may not be as available or accessible as other species (Pires 2012). In fact, several criminological studies have found this to be the case. Species that are less valuable, less rare, and that are average appearing in terms of “attractiveness” are the ones that are

poached and trafficked most frequently (Pires 2015a; Pires and Petrossian 2016; Pires and Clarke 2012, 2011). Factors of opportunity actually explain poaching variation the best. That is, species that are closer to illicit markets, have larger ranges, are more abundant, nest closer to the ground, and are more concealable are significantly related to higher poaching counts in several countries (Pires 2015a, 2015b; Pires and Petrossian 2016; Pires and Clarke 2012, 2011). However, one study has found that the more attractive species in Mexico were poached more often even while controlling for opportunistic factors (Tella and Hiraldo 2014).

More recent criminological research has been able to map where and when poaching is occurring in Bolivia. Pires et al. (2015b) found that parrot poaching is highly concentrated in space, in time, on particular species, and on particular methods of obtaining them. Just seven municipalities, or 11 percent of the total area in a department of Bolivia (the political equivalent of a US state), accounted for over 80 percent of poaching. Further, about 50 percent of poaching occurred in a three-month window during the summer. Overall, the implications of such findings are to allocate conservation and law enforcement resources to particular areas, at particular times, and protect the most-endangered species along with the most poached ones. In doing so, the largest reduction in the illegal parrot trade can be achieved while using limited resources more prudently.

VII. Implications for Future Research

As this systematic review of the literature has shown, the illegal wildlife trade varies greatly in nature and in scope. There are some common patterns among species in the trade in relation to methods used, actors involved, demand and supply countries, and purposes of the trade; but the trade also operates uniquely for each species. Acknowledging that the trade operates in slightly different ways for each species is important to consider as it relates to interventions to reduce the trade. Policymakers cannot simply reduce the trade in all species using the same tool. What works with one species may not work with another because there are numerous contextual factors involved. Policymakers need to use a myriad of tools that are tailored toward a specific species and the larger problem at hand.

Most research on the topic emanates from the conservation sciences as they regularly obtain grants, conduct field research, and, even at times, implement solutions to reduce wildlife crime. Evaluations of such interventions are lacking and need to be conducted on a frequent basis going forward so that both the academic and policy communities can learn what works with respect to how, why, and with which species. Criminologists and criminal justice scholars have a role to play in these evaluations since they are best suited to understand why crime occurs and how it may be prevented through a number of ways. Hopefully, interdisciplinary collaborations, such as those between conservationists and

criminologists, can foster a better understanding of how to mitigate the illegal wildlife trade and conserve at-risk species.

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Notes:

([1]) Retrieved on January17. 2016 https://cites.org/eng/news/pr/2013/20130523_un_lra.php. A recent *National Geographic* also investigated this potential link: http://www.nationalgeographic.com/tracking-ivory/article.html.

([2]) Pseudo-hunting comes in the form of nonhunters, such as Vietnamese citizens, getting hunting permits in order to obtain rhino horn and take it home legally. Many of such hunters had to be trained to shoot a gun and, sometimes, had the guide shoot the rhino on their behalf. Between 2009 and 2012, nearly half of all foreign permit holders in South Africa were from Vietnam (Milliken and Shaw 2012).

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