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Opinion Article

Trade bans: a perfect storm for poaching?

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Abstract
Since CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) ratification 40 years ago, trade bans have emerged as a principle conservation tool for endangered species. While trade bans have been successful in helping to stabilize populations of certain species, evidence for others suggests that such bans are proving less effective. Looking at three species, the author identifies and explores a conflux of forces that, in the context of a trade ban, may result in an increase of illegal trade, further threatening a species already at risk. These forces include 1) inelastic demand and high profit potential, 2) long history of trade, both legal and illegal, coupled with strong cultural affiliation, 3) ambiguous property rights, 4) negative economic incentives for conservation due to human-animal conflict, and 5) inadequate enforcement. Termed a "Perfect Storm", these forces combine to accelerate the demise of the species. In essence, a trade ban hands a monopoly on commerce to the black market. It is even possible that the trade ban protects the illegal market against competition, suggesting that other conservation tactics warrant consideration. The author concludes that legal, regulated trade needs to be fully investigated using fields of science that have evolved during CITES lifetime to determine if it is a viable tactic for conservation when such conditions exist.

Key words: CITES, trade ban, illegal market, inelastic demand, poaching

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Introduction

Next year, CITES, the Convention on International Trade in Endangered Species, will turn 40. When ratified, the idea of a global treaty to regulate trade for wildlife conservation purposes was groundbreaking [1-3]. The underlying premise was that restrictions on trade are the appropriate policy response to commercially derived threats [4]. The basic structure of CITES as a mechanism for limiting and prohibiting trade in threatened species reflects the assumption that when a species is no longer legally available for trade, law-abiding people will stop buying or will switch to something else [5]. Consumers willing to take the risk of buying from the black market will be put off by high prices or certain and severe penalties [5,6].

CITES regulates trade by placing species that are in danger of becoming extinct or threatened on Appendix I, in which all commercial trade is prohibited, or on Appendix II, where conditions on trade are imposed [1,2]. The "Precautionary Principle", which was formally adopted 21 years after ratification but always implied, requires that CITES should always err on the conservative side [1,7]. Implementation relies on parties to regulate and manage trade through Management and Scientific Authorities [1-3]. For many of the parties, compliance with CITES has been challenging and controversial, as they are simultaneously required to forego use of a natural resource while diverting or procuring resources to regulate and manage trade, as well as comply with record-keeping and reporting requirements [6,8].

The term "Perfect Storm" is used to describe a rare event where circumstances, none of which would independently be lethal, converge with a catastrophic outcome. In terms of illegal trade in wildlife, such a "Perfect Storm" can be observed when five unique elements funnel together. When the conditions for a "Perfect Storm" for poaching exist, a trade ban may have the unintended effect of increasing, rather than decreasing, illegal trade, thereby accelerating the decline of the species in the wild. This paper describes and illustrates those five elements using the tiger, rhino, and elephant as examples. This phenomenon may have wider relevance for other species. The objective of this paper is to propose that legal and regulated trade be fully and objectively investigated as a viable conservation tactic when conditions for a "Perfect Storm" exist.

Since CITES' inception, trade bans have helped a number of species stabilize and maintain secure populations. These include Neotropical parrots and crocodilians [8-10]. For parrots, studies have shown a high correlation between increased trade regulation and a decrease in poaching [8,9]. In addition, a trade ban in one geographic region did not result in a shift of trade to another [8,9]. In the case of crocodilians, many wild populations were in danger of becoming extinct, and most species were placed on Appendix I in 1975 [10]. By the 1990s demand for wild crocodilian skins was mostly eliminated as demand was almost entirely met through sustainable use programs [10].

Forty years on, the conservation landscape has matured and evolved. The experience gained through CITES has shed light on global trade bans, both in their implementation and their effectiveness [5,8,9]. Importantly, the field of environmental economics has emerged, providing a better understanding of the dynamics of trade bans, what they require to be successful, and how humans react [5,6,8].

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Trade bans can work. In the short term, they can provide breathing space for species in sudden and immediate danger, so that the drivers of trade can be identified and remedial actions implemented. This can be the case where the volume of trade is so large and the velocity so high that a trade ban is appropriate through application of the Precautionary Principle, which requires erring on the conservative side when making a decision to decrease protection [1,7]. A ban may give the population time to recover, yet trade bans can also backfire, meaning they may have worse outcomes than being ineffective or causing inefficient allocation of resources. A sharp increase in poaching and rise in commercial value may coincide with their implementation (or even announcement thereof) [8, 11]. When a "Perfect Storm" exists, a trade ban may be the final blow to an endangered species. Three species, the tiger (figure 1), elephant (figure 2) and rhino (figure3), illustrate this situation.

Status

The tiger, *Panthera tigris*, is listed as "Endangered" on the IUCN Red List of Threatened Species [12]. Comparing today's wild tiger populations with those two tiger generations ago in the 1990's suggests a decline of over 50% [12]. The breeding population, considered to be a key indicator of the health of the species, has declined by more than 20% during the last two tiger generations, and this decline may not be reversible [12]. Three of the original eight sub-species have gone extinct since the 1950s, and it is thought that a fourth is also extinct [12,13]. All tiger sub-species were listed on Appendix I in 1975, with the exception of the Amur tiger, which was listed in 1989.



Fig. 1. Amur tigers in one of China's captive breeding facilities. Photo credit: E. Conrad

Elephants occur in 37 countries on two continents [14]. African elephants, *Loxodonta africana*, are recorded as "Vulnerable" by the IUCN [14]. The status of the African elephant varies considerably across its extensive range [14]; however, poaching and illegal trade are of increasing concern as tens of thousands of African elephants were illegally killed in 2011 [15]. Trade in African elephants was banned in 1990, with several countries entering exemptions; by 2007, regulated trade had been allowed for the populations of four countries and several others were allowed small export quotas [16]. It has not been possible to determine with certainty the impact of this activity on wild populations, but it is clear that poaching is on the increase [15]. The Asian elephant *Elephus maximus*, is listed as "Endangered" on the IUCN Red List and was placed on CITES Appendix 1 in 1975 [14,16]. Its population is decreasing [14]. Three sub-species occur in Asia; despite the lack of tusks in some males and all females, ivory poaching is listed as a major threat [14].

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Fig. 2. Elephants are in demand primarily for their ivory, but are also a source of protein. Photo credit: Mongabay.com.

There are five species of rhinoceros, three of which occur in Asia and two in Africa [12,14]. Commercial trade in all has been prohibited since 1975, with the exception of the white rhino, which was down-listed to Appendix II in 1995 (Zimbabwe) and 2005 (South Africa) [16]. The IUCN Red List categorizes the Sumatran rhinoceros (*Dicerorhinus sumatrensis*) as Critically Endangered because populations have decreased by over 80% in the last three rhino generations [14]. The Javan rhinocerous, (*Rhinocerous sondaicus*) is also Critically Endangered [14]. The cause of decline has been attributed to excessive demand for rhino products in traditional medicine [1, 14]. The Indian rhinoceros, *Rhinocerous unicornis*, is Vulnerable and suffers from habitat loss as well as poaching [14].



Fig. 3. On a weight basis, rhino horn is now more valuable than gold. Photo credit: B. Moyle.

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The African black rhinoceros, *Dicerous bicornis*, is Critically Endangered [12]. Poaching has been identified as the main cause in the 97% decline of its population since 1960 [12]. A sub-species of the black rhino was declared extinct in 2011 [15]. The other African species of rhinoceros, the white rhino, *Ceratotherium simum*, is Near Threatened, also due to an increased poaching threat [12]. In 2007, 13 rhinos were poached from South Africa [15]. This number rose to 448 in 2011 and is expected to exceed 600 in 2012 [15]. Reports of theft of rhino horn underscore the strength of demand; since 2011, fifty-six thefts occurred from museums, auction houses, antique and taxidermist shops in 15 countries [15].

The Perfect Storm

An unprecedented level of poaching is pushing the tiger, elephant and rhino towards extinction [15]. The cause of poaching cannot be assigned to one factor. Rather, there are a number of independent elements which converge to create a "Perfect Storm. First, for certain segments of the market, demand for these species is inelastic for the remaining buyers, meaning that they are not price sensitive [17]. Tiger and rhino have what is believed by many to be an irreplaceable ingredient in traditional medicine for life-threatening diseases, so that buyers will pay relatively high amounts to obtain it [18,19]. Indeed, it is possible that the high prices paid may add to the perceived value, like a luxury good [11,17]. In this light, consumption or display of illegal wildlife becomes a display of wealth and/or connections [20]. Rhino horn has become a status symbol of Vietnam's newly wealthy [21] and has long been depicted in art, used in religious practices and for medicinal purposes in Nepal [22]. Among Asians, the display of ivory carvings, tusks, or wearing of ivory jewelry conveys prosperity and status [23-25]. Consumers of price-inelastic goods are reluctant to accept substitutes, and they are willing to take acquisition risks if the product is illegal [19]. In the case of one market destination, China, traffickers and buyers risk the death penalty for tiger and rhino derivatives, or even fakes [26].

Related to the relative inelasticity is that tiger parts, elephant ivory, and rhino horn[1] have high commercial value with ensuing lucrative margins for the illegal traders [25]. Although it is difficult to get accurate price information, the retail price for a tiger skin has been estimated at US$20,000, ivory at US$900/kg, and rhino horn at up to US$50,000/kg [25]. This means that, when coupled with inelastic demand and lack of acceptable substitutes, scarcity translates into increased financial returns for illegal traders, who adopt sophisticated and sometimes violent measures to protect their business interests [8, 15,17].

In such cases, it is questionable whether demand reduction campaigns can change behavior *in time* to reduce poaching to sustainable levels. Campaigns have to reach—and convince—those hard-core buyers whose consumption may put wild populations under the minimum population threshold, if not annihilate them altogether, in the immediate future [17,19]. Several Project Tiger reserves in India were "poached out" when gangs systematically moved from one national park to another [27]. The CITES Secretariat warns that the current rate of rhino poaching can render rhinos extinct within our lifetime [15]. Much work has gone into demand reduction, and we are learning that successful campaigns must be carefully crafted and culturally relevant [28].

1 Other high-value goods include caviar, great apes and exotic birds and reptiles [25].

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Successful campaigns also require that consequences be imposed for non-compliance, and that a stigma become associated with illegal activity [6,28].

The second element in the "Perfect Storm" is that trade, both legal and illegal, has taken place for thousands of years. Since the imposition of a trade ban, parts of it have moved underground [17,19]. One way to look at the CITES-driven trade embargo is that it has handed a lucrative business to the black market, and protects it from competition by prohibiting competition from legal sources. Because the ban has been in place for a number of years, the illegal market has become entrenched. Traders have become expert in avoiding controls: India's Sansar Chand evaded prosecution for over 40 cases dating back to the year after CITES was promulgated [17].

The history of the three species is intertwined with that of certain cultures, and some people in these cultures view them as an ancient tradition or integral part of their identity [18]. The ivory business is more than 2,000 years old: China exported carved ivory along the Silk Road during the Han Dynasty, 206 BC-220AD [29]. Trade in rhino horn goes equally far back; some of the earliest records date back to 200BC-200AD [26]. The first written records for the use of tiger bone in Traditional Chinese Medecine are in 500AD [30].
Because of the long history of cultural affinity, and historical occurrence of trade, demand reduction is probably a multi-generational process.

The third common element is that tigers, rhinos, and elephants occur on public land. As such, they belong to everybody, but to nobody in particular. Ambiguous or 'over-diluted' property rights lead to what economists call "the tragedy of the commons" [4]. The thinking goes like this: "If nobody owns it, nobody protects it, and best if I help myself before my neighbor does." Some data suggest that animals on privately-held land suffer less poaching and overexploitation because of vested economic interests. In communal conservancies in Namibia, overall wildlife populations are growing, and much of this growth is attributed to the almost complete cessation of illegal hunting since the conservancies were established in 1996 [31]. Total income, 90% of which is wildlife-driven, has increased from US$70K in 1990 to US$5.25milion in 2010 [31]. One might reason that this revenue source, which did not exist prior to establishment of the conservancies, now provides a legal incentive to manage towards sustainability and protection of the communal resource, and that the costs associated with protection are transferred from the social to private sectors. Such incentives are absent for the illegal market.

Trophy hunting in Africa is not the first thing that comes to mind when thinking about conservation, but some studies show it can generate important incentives for conservation, and some conservation organizations agree [32,33]. By way of contrast, in India, eco-tourism in national parks and reserves has failed to reverse the "worth more alive than dead" equation that persists for the tiger [34].

Fourth, all three species experience or cause conflict with humans, imposing significant costs. Tigers, many of which have been forced to the fringes of good habitat, frequently attack humans or their domestic livestock. In peninsular Malaysia, over a fifteen year period, on average tigers attacked humans, domestic livestock, or were seen, two days out of every five [35]. Crop damage by rhinos is considered detrimental to conservation efforts [22]. Human/elephant conflict is a major concern in most of the elephant range countries in Asia and Africa and results in hundreds of both human and elephant deaths annually [14,34]. People who lose family members, domestic livestock, or crops to tiger, rhino and elephants naturally perceive these

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species as pests and therefore persecute them [23]. This is especially so when there is no economic upside to sharing habitat, and the conflict may be exacerbated by the imposition of a trade ban that removed a source of sustenance and income, replacing benefits with a financial burden [8]. A government can mandate compliance, but no government can enforce its mandate under such circumstances.

The fifth and final common element is that the trade ban is inadequately enforced. This may be due to a lack of what is commonly referred to as “political will," which in many developing countries is in short supply. In terms of wildlife, “lack of political will” is reflected in incredibly long times to prosecute a case (if charges are brought at all), trivial fines, and little or no sentencing. In the words of one scientist who worked in a tiger, elephant, and possible rhino range state National Park in Southeast Asia, “When a poacher is caught, the police just sit around and chuckle.” [36] Even if trade bans enjoy political and popular support, they can be too difficult, costly, or just too low a priority to be effectively or enthusiastically implemented [17].

“Lack of political will” is also a polite phrase for corruption. There are significant concerns about corruption at almost every node of the relevant supply chains [27]. DNA samples from a restaurant in Ningbo, China tested positive for tiger, and illegal production and sale of tiger bone wine from a captive breeding facility have been reported since the late 1990s [37]. In 2008, an official from the Vietnamese embassy in Pretoria, South Africa, was filmed buying rhino horn from a known trader, and other embassy staff were named as being involved in the trade [21]. TRAFFIC, the wildlife trade monitoring arm of the World Wildlife Fund, singles out the lack of law enforcement against illegal ivory traders as a key factor in the recent increase in elephant poaching [24].

All this means that the collective black market has a monopoly on a profitable business, one that was created, and is now protected, by legislation supporting trade restrictions[2][5,38]. A situation for wildlife products for which there is 1) inelastic demand and high profit potential, 2) long history of trade and a strong cultural affiliation, 3) ambiguous property rights, 4) human-animal conflict causing negative incentives for conservation, and 5) inadequate enforcement adds up to a “Perfect Storm”. In this situation, continuing or implementing a trade ban may be the nail in the coffin for the very species it is meant to protect [5,6,11]. Moreover, increased enforcement effort may equate to higher risks, which can translate into bigger profit margins for illegal traders as buyers seek, and sometimes hoard, increasingly scare resources [4,5,20,25]. These profits accrue only to the black market, instead of to wildlife conservation or use by local communities for their own livelihood.

Legal Trade?

One possible solution, legal and managed trade based on sustainable use of the species, has been discounted or ruled out by many in the conservation community. There are a number of reasons for this, some of which are discussed elsewhere [5,10,11]. Few, if any, topics are more hotly debated than the question of legal trade, how it might be managed, and its possible impact on wild populations. Probably most of the people active in conservation genuinely believe that

2 While CITES is the only global trade treaty, prior to joining, many countries had enacted legislation regulating commerce or trade in endangered species [3,4].

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legal trade will have a detrimental impact on endangered species [37]. Some animal welfare organizations that are active in wildlife conservation are also opposed to the idea of trade. While there is a great deal of uncertainty, it is possible to explore the implications of legal trade, without putting the target species at risk, by applying the tools of environmental and social economics. What is required, at this time, are serious scientific studies to elevate the debate, from which policy can be rationally developed.

As it moves into middle age, CITES needs to take stock of the lessons learned over the last forty years to ensure that its policies are rooted in the disciplined application of fact-based knowledge. Science, including social science—because, after all, the fate of wildlife lies in human hands—should guide strategy and decision-making. Given the abject failure of the trade ban to stem the decline of wild populations in the case of tigers, rhinos and elephants, legal trade needs to be given due consideration. Put another way, the solution to controlling the illegal market may be to outcompete it [38].

The specter of slaughtering tigers, shaving off rhino horn and selling off elephants is sure to raise a heated debate. Yet data on the continuing decline of wild populations and persistence of poaching should not be denied. When certain consumers will pay dearly, there is a significant profit to be made, trade networks are well established, ownership is vague, the animals are worth more dead than alive, and the odds of getting caught are slim, how can a trade ban be effective? In the case of the tiger, rhino and elephant, the "Perfect Storm" is creating conditions under which a trade ban has the opposite effect from its intentions. The time to think differently about CITES and trade us upon us. What is required is research to achieve a better understanding of both illegal and legal markets, the potential of credible alternatives, and how such alternatives might work. Knowledge gained from such research might enable us to dispel the Perfect Storm before it destroys the species it threatens.

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