AN INTRODUCTION TO THE ILLEGAL TRADE IN WILDLIFE: A SNAPSHOT OF THE ILLICIT TRADE IN RHINOCEROS HORN

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The illicit trade in wildlife is a multibillion dollar global criminal enterprise that capitalises on drivers such as poverty, corruption, poor public education and ineffective regulation at great cost to both human and non-human life. Despite the remarkable value of goods traded and myriad of consequences, green criminologists such as Wyatt have lamented that the problem 'remains on the fringes of both academia and policy.'[1]

The purpose of this article is to set out the problem of the illegal trade in wildlife in the context of recent technological and scientific development. In doing so, it will demonstrate that it has, in fact, risen to prominence as an issue of global concern, now framed as one of transnational crime.[2] *It will map out the nature and extent of the trade in rhinoceros horn, as a representative case commodity, before discussing contemporary issues that may inform future regulatory action.*

I INTRODUCTION

In July 2015, two historic events positioned the illegal trade in wildlife squarely in the sights of the international legal community. Firstly, on 13 July 2015, the Wildlife Justice Commission launched in The Hague to specifically address wildlife crime as a matter of global concern. An Accountability Panel will hold hearings on one or two wildlife crimes selected each year by the Commission for examination.[3] While the Commission has no powers of arrest or penalty, the panel will publish a ruling of the facts on the selected activity, including identification of the parties involved. The weight of such rulings will be

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1 Tanya Wyatt, *Wildlife Trafficking: A Deconstruction of the Crime, the Victims and the Offenders* (Palgrave Macmillan, 2013) 9.

2 Rob White, *Crime, Criminality and Criminal Justice* (Oxford University Press, 2012) 257. White defines 'transnational crime' as 'crime that is global in scope and reflects broad socioeconomic processes and trends associated with globalisation.'

3 Wildlife Justice Commission, 'The Wildlife Justice Commission Launches- New Approach to Combat Wildlife Crime' (13 July 2015) <http://www.wildlifejustice.org/article/index.html>. See also: Cahal Milmo, 'The Wildlife Justice Commission: International body launches in effort to combat biggest 'Al Capone' poachers', *The Independent* (online) 11 July 2015 <http://www.independent.co.uk/news/world/the-wildlife-justice-commission-international-body-launches-in-effort-to-combat-biggest-al-capone-poachers-10382859.html>.

considerably aided by the use of hi-tech tools of investigation including DNA profiling and GPS tracking of shipments.[4] Secondly, on 30 July 2015, at the 69th session of the United Nations, the General Assembly unanimously adopted Resolution A/RES/69/314 entitled *Tackling the Illicit Trafficking in Wildlife (co-sponsored by Gabon, Germany and 84 other nations)*.[5] The UN resolution encourages countries to 'adopt effective measures to prevent and counter the serious problem of crimes that have an impact on the environment, such as illicit trafficking in wildlife and wildlife products…as well as poaching.'[6]

While these two landmark actions have elevated the global recognition of the illegal trade in wildlife, they have also highlighted the array of challenges for law enforcement in combatting the pervasive networks of actors involved. In light of the complexity of the problem, this paper will aim to add to the growing body of literature that seeks to better comprehend and communicate the dimensions of wildlife crime. The purpose of this paper is to set out the problem of the illegal trade in wildlife in the context of recent technological and scientific developments, utilising the trafficking of rhinoceros horn as a case study.[7] It will outline the nature and extent of the problem using recent data sets before discussing contemporary issues and research which may colour further regulatory development.

II THE PROBLEM

The illegal trade in wildlife is a multi-billion dollar industry, estimated between $US5- 20 billion per annum.[8] This places wildlife crime as the fourth most lucrative form of transnational crime behind the trafficking of narcotics, humans and armaments respectively.[9] The trade includes the trafficking of live species (for example, the selling of exotic animals

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4 Ibid.

5 *Tackling the Illicit Trafficking in Wildlife, GA Res* 69/314, UN GAOR, 69th sess, 100th plen mtg, Agenda Item 13, Supp No 49, UN Doc A/RES/69/314 (30 July 2015). See also: United Nations, 'Speakers Call for Concerted Action to Crush Multibillion-Dollar Illicit Wildlife Trade as General Assembly Adopts Sweeping text' (Meeting Coverage, General Assembly, Sixty-ninth session, 100th Meeting, 30 July 2015) <http://www.un.org/press/en/2015/ga11666.doc.htm>.

6 TRAFFIC, 'UN adopts resolution on tackling wildlife trafficking' (30 July 2015) < http://www.traffic.org/home/2015/7/30/un-adopts-resolution-on-tackling-wildlife-trafficking.html>. Members States have recognised the need for action across all levels of the supply chain to undermine the market, including: influencing consumer behavior, enacting anti-money laundering mechanisms, targeting corruption and organised crime syndicates, creating 'national-level inter-agency wildlife crime task forces' and increasing the effectiveness of law enforcement, notably the judicial process.

7 Rhinoceros horn was selected as the case commodity to explore the illicit trade due to the availability of longitudinal data sets as well as representation of the broader problem. As previously identified by Kamieniecky, '[r]hino products are a significant sub-market of the global illegal species trade' and further 'in terms of monetary value per unit of weight, rhino horn is one of the most valued natural resources.' See: Gilbert Benjamin Kamieniecky, *Multilateral Wildlife Conservation Policy: A Political-Economic Analysis Of The Trade ban On African Rhinoceros Products* (Master of Studies in International Relations, presented to the Degree Committee of International Studies, University of Cambridge, 2007) 14.

8 Tom Milliken, US Aid and TRAFFIC, *Illegal Trade and Rhino Horn: an Assessment Report to Improve Law Enforcement Under the Wildlife TRAPS Project* (2014) 1. See also: World Wildlife Fund and Dalberg, *Fighting illicit wildlife trafficking: A consultation with governments* (2012) < http://www.dalberg.com/documents/WWF_Wildlife_Trafficking.pdf>. WWF and Dalberg broke down this estimation, designating US$4.2-9.5 billion per annum for unreported and unregulated fisheries trade alone, U$S7 billion for illegal trade in timber, and US$7.8billion- US$10 billion illicit per annum in wildlife trafficking (excluding fisheries and timber). This calculation was further reported by Johannes Myburgh quoted in Jeremy Haken, *Transnational Crime in the Developing World, Global Financial Integrity*, (Global Financial Integrity, 2011).

9 Ibid.

into the illegal pet trade) and their parts (for example, the sale of pangolin scales, tiger bones and elephant ivory). More precisely, South and Wyatt define 'illicit wildlife trafficking' as 'any environment-related crime that involves the illegal trade, smuggling, poaching, capture or collection of endangered species, protected wildlife (including animals and plants that are subject to harvest quotas and regulated by permits), derivatives or products thereof.'[10] The scope of 'wildlife' refers to 'all non-human animals and plants that are not companion or domesticated animals.'[11] Under this conception, pets and livestock are excluded whereas zoo animals that may be farmed but are not truly domesticated are included (for example, cattle farmed for beef would be excluded whereas rhinoceroses farmed for their horns would qualify).[12] The illicit trade has become a globally entrenched problem, with Wyatt identifying Africa, North, South and Central America and Asia as prominent supply regions, and Europe, North America, the Middle East and Far East (Japan, China and Korea) as common destinations.[13] The ramifications range from longstanding environmental concerns for species conservation,[14] public health trepidations over the international transmission of zoonotic diseases and lack of quality control in medical products,[15] to more recently uncovered links to the funding of terrorist activities and other forms of organised crime.[16]

The proliferation of the problem can be at least partially attributed to the diversity of applications for desired commodities. Patel et al list some of these uses: 'as food, pets, medicines, clothing, trophies, and religious amulets.'[17] Further, the persistence of the problem is compounded by the cultural, traditional or customary value of some of the goods trafficked. Rhinoceros horn presents a case example of a traded item of multifaceted utility, valued for its aesthetic appeal (either attached to the animal as a big game trophy or refashioned as a building material for luxury items), use in religious ceremonies and cultural rites of passage, as well as extensive history in traditional medicines, most prominently in Traditional Chinese Medicine (TCM). Poaching to acquire rhinoceros horn has wrought disastrous consequences for all five extant species of rhino. The IUCN Red List 3.1 indicates that three of the five species of rhinoceros are 'critically endangered' (Black, Sumatran and Javan). Of the remaining two species, the White Rhinoceros is classified as 'Near Threatened' and the Indian Rhinoceros is 'Vulnerable.' In 1977, the international community mobilised to ban the trade in rhinoceros horn under the *Convention on International Trade in*

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10 Nigel South and Tanya Wyatt, 'Comparing illicit trades in wildlife and drugs: an exploratory study' (2011) 32(6) *Deviant Behavior* 538-61. This definition also quoted in World Wildlife Fund and Dalberg, *Fighting illicit wildlife trafficking: A consultation with governments* (2012) 9.

11 Wyatt, above n 1, 2.

12 Ibid.

13 Tanya Wyatt, *Green Criminology & Wildlife Trafficking: The Illegal Fur and Falcon Trades in Russia Far East* (Lambert Academic Publishing, 2012) 13.

14 Daniel W S Challender, Stuart R Harrop and Douglas C MacMillan, 'Towards informed and multi-faceted wildlife trade interventions' (2015) 3 *Global Ecology and Conservation* 129-148, 129.

15 J Still, 'Use of animal products in traditional Chinese medicine: environmental impact and health hazards' (2003) 11 *Complementary Therapies in Medicine* 118-22; Diana Bell, Scott Roberton and Paul R Hunter, 'Animal origins of SARS coronavirus: possible links with the international trade in small carnivores' (2004) 359(1447) *Philosophical Transaction of the Royal Societys B* 1107-1114.

16 Damian Carrington, 'People and animals at immediate risks from wildlife crime, CITES chief warns' *The Guardian* (online) 2 March 2013 <http://www.theguardian.com/environment/2013/mar/01/people-animals-wildlife-crime>; Suzanne Goldenberg, 'Ban Ki-moon to warn UN security council of dangers of wildlife trafficking', *The Guardian* (online) <http://www.theguardian.com/world/2013/may/28/un-ban-kimoon-wildlife-trafficking-central-africa>.

17 Nikkita Gunvant Patel et al, 'Quantitative methods of identifying the key nodes in the illegal wildlife trade network' *Proceedings of the National Academy of Science of the United States of America* published online before print June 15, 2015 doi: 10.1073/pnas.1500862112, 1.

Endangered Species of Wild Fauna and Flora[18] yet current data indicates that international demand is continuing to drive rhinoceros poaching and trafficking to unprecedented heights. It is at this time that significant effort ought to be channelled into evaluating the existing regulatory framework to elucidate viable solutions to prevent extinction and undermine the resilience of criminal networks. However, as decisions to invest in reform are inherently political, particularly on an international scale, this necessitates an investigation as to what the negative consequences are for human, let alone non-human, life.

III EXTENT & SIGNIFICANCE OF THE PROBLEM

A *Wyatt's Four Dimensions of Significance*

In *Wildlife Trafficking: A Deconstruction of the Crime, the Victims and the Offenders*, Wyatt undertakes a sophisticated analysis of the significance of wildlife trafficking. Wyatt identifies four interrelated dimensions of impact: environmental, economic, human and national security.[19]

The environmental consequences are perhaps the most obvious, whereupon trafficking accrues environmental harm through: a) undermining biodiversity by endangering and/or causing the extinction of trafficked species, b) ecosystem disruption (particularly when apex predators are removed from the food chain, creating a trophic cascade) as well as c) the introduction of invasive species and diseases which threatens native species of flora and fauna.[20] Economic consequences flow from these environmental impacts by straining or destroying natural resources which may be the source of income in the form of government tax revenue, business profits (for example, where fisheries, forestry and agricultural industries require environmental security to thrive and attract ongoing investment) and personal livelihoods.[21]

Human impacts are frequently linked to economic and environmental impacts whereby ecosystem or industrial disruption leads to food scarcity or lack of job security, thus instigating the relocation of individuals or entire communities.[22] Another human impact concerns the undermining public health through the spread of zoonotic diseases, including SARS and Ebola, commencing with the consumption or mere contact with illegal wildlife products.[23] Further still, some commodities such as rhinoceros horn and elephant ivory have become as well known for their human-human bloodshed as the human-non human violence that poaching practices impose.[24] This disturbance of civil peace prompted by 'poaching wars' offers a link between human impact and the fourth and final dimension of the impact of wildlife trafficking, national security. Wildlife trafficking impacts on national security as it profits organised crime, promotes corruption, and funds terrorism and insurgency. Wyatt suggests that organised crime syndicates have made use of existing black market trade routes established for the trafficking of other commodities such as armaments, drugs and humans to import and/or export wildlife goods, with some conducting shipments in tandem. These

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18 *Convention on International Trade in Endangered Species of Wild Fauna and Flora*, opened for signature 3 March 1973, 993 UNTS 243 (entered into force I July 1975).
19 Wyatt, above n 1, 39-58.
20 Ibid 39-43.
21 Ibid 44-46.
22 Ibid 44.
23 Ibid 49-51.
24 Ibid 49-51.

syndicates, Wyatt advances, threaten national security through their undue influence 'on politics, the media, the public, the courts and the economy.'[25] A prime example arises in the extent of official corruption that participates at each threshold of the supply chain in countries of origin, transit and destination. The systemic corruption of decision makers and authorities challenges national security by undermining the rule of law and good governance. Finally, with respect to the link between wildlife trafficking and terrorism, profits from conflict resources and black market goods have been used to fund terrorist activities, with a similar concern having been raised with regard to insurgent rebel groups who threaten state order. [26] There is also a fringe concern over the possibility of employing zoonotic diseases in bio-terrorist attacks.[27]

This brief account of Wyatt's four dimensions of wildlife trafficking impacts illuminates the complex and compounding nature of its harms. However, it must be noted that these are but the known ramifications of the known incidences of the crime, and so there may well be dimensions of impact yet uncovered. Research into the illicit trade in wildlife suffers from the same 'dark figure' problem affecting criminological data generally, this being uncertainty as to the precise frequency and extent of criminal activity.[28] Mindful of this limitation, the TRAFFIC network has taken up the task of collecting and analysing existing data to form as complete a picture of the crime as possible in the fight to protect species across the globe.

B *Introducing TRAFFIC & Poaching Statistics*

The most reliable longitudinal data on the illegal trade in wildlife is provided by TRAFFIC.[29] TRAFFIC is a wildlife trade monitoring network and joint programme of the World Wildlife Fund (WWF) and International Union for Conservation of Nature (IUCN), and operates collaboratively with the Secretariat of the CITES. Founded in 1976, the network produced a seminal study into the trade in seal products in 1978, followed by an analysis of the trade in wild cat skins in 1979. That same year saw the launch of the *TRAFFIC Bulletin*, the only international journal devoted exclusively to wildlife trade issues. By way of impact, TRAFFIC's research has bolstered law reform efforts, for example the US Congress passed the *Rhino and Tiger Product Labeling Act* in 1998 citing TRAFFIC's research into North American medicines claiming to contain rhinoceros and tiger ingredients.

TRAFFIC has published extensively on both the licit and illicit trade in rhinoceros horn. Following its ground-breaking success in mapping out ivory supply chains, TRAFFIC released its 1992 review of the world trade of rhinoceros horn, seeking to determine the volume and price of horn and to plot the extent of the trade.[30] The study relied much on the work of E.B. Martin and colleagues in conjunction with the files of TRAFFIC and the World Conservation Monitoring Centre.[31] The reasons for decline in wild populations were

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25 Ibid 54.
26 Ibid 51-57.
27 Ibid 51-57.
28 Ibid 8-9.
29 <http://www.traffic.org/>. TRAFFIC's mission 'is to ensure that trade in wild plants and animals is not a threat to the conservation of nature.'
30 Nigel Leader-Williams, TRAFFIC, *The World Trade in Rhino Horn: A Review* (1992, TRAFFIC International and the People's Trust for Endangered Species).
31 Ibid 3. Subsequent reports canvass topics including: the decline in the black rhino in Zimbabwe (1993), the trade in South Korea (1994), poaching and protection of the Indian rhino (1996), rhino horn and bone in China post-1993 ban (1997), the horn trade in Yemen (1997) and the South Africa- Vietnam trade

determined to be: loss of habitat, use of rhino horn in both commercial and indigenous medicines (and to a lesser extent the use of other rhino products such as skin, blood and urine) and use of the horn to construct the handles of traditional Yemeni daggers (known as 'jambiyas').[32] The use of rhinoceros parts for traditional medicine was attributed primarily to the Chinese pharmacopeia but also extended to Burmese, Thai and Nepalese practices whereas Japanese and Korean communities were found to exclusively use the horn and no other piece of rhinoceros anatomy.[33] The paper cited seizures of intended shipments in Los Angeles, San Francisco and Brussels as indicative of wider use within Asian Diasporas in western countries.[34] The 1992 report also investigated the domestic consumption of rhinoceros horn produced in Africa, concluding that unlike Asian markets which both consumed and exported locally grown rhinoceros horn, there was little evidence of domestic consumption of African rhino horn, and thus overseas demand was the primary driver for trade.[35] By way of legal exports, data from Kenya, Uganda and Tanganyika (now Tanzania) provided the most longitudinally extensive data sets correlating volume and price.[36] During the 1930s the average annual export out of East Africa was 1600kg, dropping to 500kg during WWII and rising to 2500kg immediately after the war.[37] The rates dropped to an annual mean of 1800kg in the 1950s, 1300kg in the 1960s and increased to 3400kg in the 1970s, with a rapid increase in the mid-70s in the lead up to the CITES ban taking effect in 1977.[38]

CITES entered into force on 1 July 1975 as a multilateral treaty recognising the value and need to protect wild flora and fauna intra and inter-generationally, whilst recognising the pivotal role of States (supported by international co-operation) in contending with the urgency of the problem.[39] From its inception in Washington DC in 1973, membership has grown from 80 to 176 parties now providing for the regulation of nearly 35 000 species.[40] Crawford summarises the operation of CITES as essentially providing a hierarchical framework of trade restrictions that may be applied to protect endangered species.[41] CITES offers endangered species differentiating levels of protection contingent on their classification under one of three Appendices (with Appendix I offering the most protection and Appendix III offering the least). In brief, Appendix I: lists 'all species threatened with extinction which are or may be affected by trade.'[42] Trade in Appendix I species is generally banned and

nexus (2012). The most recent report was released in 2014 entitled 'Illegal Trade in Ivory and rhino horn: an Assessment Report to improve law enforcement under the Wildlife TRAPS project.'

32 Ibid 4.

33 Ibid.

34 Ibid.

35 Ibid 9.

36 Ibid 6.

37 Ibid.

38 Ibid.

39 The text of the *CITES* Preamble is as follows: 'The Contracting States, *Recognizing* that wild fauna and flora in their many beautiful and varied forms are an irreplaceable part of the natural systems of the earth which must be protected for this and the generations to come; *Conscious* of the ever-growing value of wild fauna and flora from aesthetic, scientific, cultural, recreational and economic points of view; *Recognizing* that peoples and States are and should be the best protectors of their own wild fauna and flora; *Recognizing*, in addition, that international co-operation is essential for the protection of certain species of wild fauna and flora against over-exploitation through international trade; *Convinced* of the urgency of taking appropriate measures to this end; *Have agreed* as follows…'

40 Julie Ayling, 'What Sustains Wildlife Crime? Rhino Horn Trading and the Resilience of Criminal Networks' (2013) 16(1) *Journal of International Wildlife Law & Policy* 57-80, 58.

41 Christine Crawford, 'Conflicts Between the Convention on International Trade in Endangered Species and the GATT in Light of Actions to Halt the Rhinoceros and Tiger Trade' (1995) 7 *Georgetown International Environmental Law Review* 555, 555.

42 Ibid 557.

exports require a permit. This permit is only issued upon a scientific finding by the state of export 'that such export will not be detrimental to the survival of that species.'[43] Imports are likewise limited by permit approval and re-export occurs exclusively whereupon the re-exporting state fulfils its burden to prove that the specimen was imported in accordance with CITES. Appendix II 'lists endangered species that are not sufficiently endangered to warrant inclusion in Appendix I' yet are sufficiently threatened to require regulation of trade. Of these restrictions (and with reference to Glennon),[44] Crawford states that 'while the export and re-export provisions of Appendix II are similar to Appendix I, the limitations on import of these species are less rigorous.'[45] Appendix III lists those species that member nations may have added for inclusion on grounds that they are endangered within their borders, but are not necessarily recognized as endangered by international standards. Trade in Appendix III species is possible with an export licence demonstrating that the species was legally obtained or imported.[46] All species of *Rhinocerotidae* are included under Appendix I of CITES but for the populations of white rhinoceros in South Africa and Swaziland which appear under Appendix II.

TRAFFIC's 2014 publication provides the latest global overview, picking up from the 1990s.[47] Where the 1977 CITES ban was a key topic in the 1992 report, the 2014 publication presents the United States' use of 'pellying' as a desirable example of state action giving effect to CITES.[48] 'Pellying,' a term referring to the United States' Pelly Amendment instrument, provides a noteworthy example of a State disrupting international trade by enforcing its own domestic standards with respect to international agreements.[49] Charnovitz has written on the topic extensively and has chronicled its development from its inception.[50] The Pelly Amendment initially concerned restricting trade with countries to tackle overfishing. The *Pelly Amendment Act* was passed in 1971 to amend the *Fishermen's Protective Act* of 1967 in response to Denmark, Norway and West Germany's refusal to comply with a prohibition on salmon fishing on the high seas (after which all three countries altered their practices).[51] The mechanics of the amendment as originally conceived are as follows: it pertained to foreign persons (not governments) who directly or indirectly conducted fishing operations that diminished the effectiveness of an international fishery program.[52] Once the fact had been communicated to the President by the Secretary of Commerce, the President could direct the Secretary of the Treasury to prohibit the fish products of the offending country 'for a duration deemed appropriate by the President and to the extent permitted by the GATT.'[53] In 1978, Congress expanded the scope of the law, adding a new track for 'engaging in trade or taking which diminished the effectiveness of any international program for endangered or threatened species whether or not such conduct is

43 Ibid; *CITES* art III(2)(a).

44 Michael J Glennon, 'Has International Law Failed the Elephant?' (1990) 84 *American Journal of International Law* 1, 11.

45 Crawford, above n 41, 557.

46 *CITES* art V.

47 Tom Milliken, TRAFFIC, *Illegal Trade In Ivory And Rhino Horn: An Assessment To Improve Law Enforcement Under The Wildlife TRAPS Project* (2014, TRAFFIC International).

48 Ibid 14.

49 Steve Charnovitz, 'Environmental Trade Sanctions And The GATT: An Analysis Of The Pelly Amendment On Foreign Environmental Practices' (1994) 9(3) *American University Journal of International Law and Policy* 751.

50 Ibid.

51 Ibid 758-9.

52 Ibid 759.

53 Ibid.

legal under the laws of the offending country.'[54] This track can be triggered by determination of either the US Secretary of Commerce or Secretary of the Interior. Following certification of the fact, the President can embargo any or all wildlife products. The threshold of 'diminishing effectiveness' is broad and includes non-ratification of a treaty, non-observance of a treaty, or even actions unrelated to a treaty such as domestic sales of an endangered species.[55] It is thus crucial to note that the test for potential pellying falls below the standard of non-compliance or breach of a treaty, and that it is sufficient that the President merely deems the activity concerned to be 'diminishing effectiveness.'

In 1987, CITES passed a resolution encouraging parties to ban all domestic and international trade in rhinoceros parts and to destroy all government stockpiles. The resolution recommended that parties 'use all appropriate means, including economic, political and diplomatic, to exert pressure on countries continuing to allow trade in rhinoceros horn…'[56] In November 1992 the World Wildlife Fund and National Wildlife Federation petitioned the Secretary of the Interior to invoke the Pelly Amendment against Taiwan, China, South Korea and the Republic of Yemen for continuing trade of rhinoceros horn. Following some negotiation with the US, both Korea and Yemen agreed to comply with CITES and cease domestic trade.[57] Subsequently, the Secretary of the Interior pressured China and Taiwan, certifying both for trade in rhino horns and tiger bones.[58] In 1993 President Clinton decided against imposing trade sanctions, citing some positive efforts made towards international conservation standards, but threatened import prohibitions if the absence of substantial progress by March 1994.[59] In March 1994, the CITES Standing Committee found that China had met minimum requirements and decided that no further action was needed whereas Taiwan was found to not have met the minimum requirements.[60] In response, in April 1994, President Clinton ordered a ban on certain wildlife specimens and products from Taiwan. China, Taiwan, and South Korea designated rhinoceros horn as a prohibited substance in the traditional pharmacopeia as a direct result of the US Pelly.

The mobilisation of CITES between the late 1980s and early 1990s, together with the United States' response, drastically diminished the global trade in rhinoceros horn as reflected in poaching data sets. According to the 2014 report, TRAFFIC identifies that poaching essentially came to a halt in the early 1990s.[61] This remained limited during the early 00s, for example, from 2002-2005 an average of 56 rhinos were illegally killed annually across Africa, increasing to an average 61 rhinos per year in 2006 and 2007.[62] A sudden boom in rhino losses then struck in 2008 with a loss of 262 animals, with nearly two-thirds killed in Zimbabwe during a period of economic turmoil and mass land reforms.[63] TRAFFIC correlates the year 2008 with the resurgence of horn trade in Vietnam.[64] By way of

54 Ibid.
55 Ibid 760.
56 Trade in Rhinoceros Products, CITES Resolution of the CoP 6.10 (Ottawa, 1987).
57 Charnovitz, above n 49, 770.
58 Ibid.
59 Ibid.
60 The case against Taiwan was ongoing and course of action had not yet been committed to at the time of Charnovitz's publication. In April 1994, Clinton ordered a ban on certain wildlife specimens and products from Taiwan.
61 Milliken, above n 47, 14.
62 Ibid, 15. During this time a poaching decline in Kenya was offset by a major increase in Zimbabwe.
63 Ibid.
64 Vietnam has been a signatory to CITES since 1994, becoming the 121st Party to the Convention. CITES is implemented in Vietnam through *Decree 82/2006/ND-CP on Management of Export, Import, Re-*

international trends, TRAFFIC reported global killings of 745 rhino in 2012 and 1090 rhino in 2013.[65]

To truly gauge the enormity of the problem, it helps to more closely examine the official regional statistics. From 2007- 2008 losses in South Africa rose from 13 to 83.[66] Since then, rates surged to 668 rhinos in 2012, 1004 rhinos in 2013,[67] and 1215 in 2014.[68] The world famous Kruger National Park was hit the hardest with 827 killed inside its bounds, demonstrating just how pervasive the problem has become.[69] The government data set, however, has come under scrutiny, with the NGO 'Saving the Survivors' alleging that official statistics account only for animals who have died and been dehorned.[70] This would discount two notable categories of fatalities caused by poaching: firstly, infant rhinos that perish after their mothers have been killed (and similarly rhino calves *in utero* that die if their mothers are killed or are aborted if their mothers are unable to recover from the stress of poaching attacks if they survive) and secondly, rhinos that have been killed but have not been dehorned (for example, in the event of a botched attempt). The data also excludes incidents where the horn has been taken but the rhino has survived. Based on anecdotal evidence from Dr Johan Marais, official estimates should be increased by of 30% to be more indicative.[71]

On 21 January 2016, TRAFFIC released its 2015 Africa-wide statistical breakdown. It noted a slight decrease in poaching in South Africa (from 1215 in 2014 down to 1175 in 2015) but emphasised that the Africa-wide figures are the worst in the continent's history (from 1299in 2014 up to 1305 in 2015). The decrease in South Africa's numbers was offset by increases in Zimbabwe (up from 12 in 2014 to 'at least 50' in 2015) and Namibia (from 24 in 2014 to 80 in 2015).

C *An International Criminal Enterprise: Numbers of Illegal Horn in Circulation & Syndicate Typologies*

Tracking the supply chain of illegally traded rhinoceros horn is vital to uncovering the conditions driving its demand as well as the prevalence of the criminal organisations involved. TRAFFIC has been cataloguing the number of rhino horns in illegal circulation since 2000 using a number of data sets.[72] The IUCN/TRAFFIC report to CITES CoP15 (Doha, Qatar, March 2010) estimated that an average of 360 horns were reaching Asia each year during the period 2006 - September 2009.[73] By comparison, the IUCN/TRAFFIC report

export, Introduction from the Sea, Transit, Breeding, Rearing and Artificial Propagation of Endangered Species of Precious and Rare Wild Fauna and Flora of 10 August 2006.

65 Milliken, above n 46, 15.

66 Ibid16.

67 Ibid.

68 'SA rhino poaching record set in 2014', *BBC News* (online), 22 January 2015 <http://www.bbc.com/news/science-environment-30934383>.

69 John R Platt, '1,215: The Record Number of Rhinos Poached in 2014', *Scientific American* (online), 23 January 2015 <http://blogs.scientificamerican.com/extinction-countdown/a-record-1-215-rhinos-were-poached-in-2014/>.

70 'Poaching stats just the tip of the horn: Annual statistics in rhino poaching should be 30% higher' *Lowvelder* (online), 29 January 2015 <http://lowvelder.co.za/247402/poaching-stats-just-tip-horn/>.

71 Ibid.

72 Milliken, above n 47, 16. Data sets include accounts of numbers of rhino horns poached, stolen from natural rhino deaths, thefts from government stockpiles and other sources, illegal private sector sales and the re-direction of legally sport-hunted trophies. This data is then offset by the number of rhino horns seized, confiscated or recovered in the field.

73 Ibid 17.

to CITES CoP16 (Bangkok, Thailand, March 2013) estimated that 1083 horns were in illegal circulation during the period 2009 - September 2012.[74] From 2009 - March 2014, TRAFFIC documented a total of 148 rhino horn seizure cases in 21 countries worldwide.[75]

Through further data analysis, TRAFFIC has begun to build criminological profiles of the actors involved in poaching organisations, drawing upon the five-level pyramid structure of rhino horn trade syndicates used by South Africa's National Wildlife Crime Reaction Unit.[76] Organisations are 'typically led by African-based Asian nationals' and 'are directly involved in procurement and illegal movement of rhino horn out of Africa to markets in Asia, especially Vietnam.'[77]Level 1 is comprised of 'the individuals and *ad hoc* gangs who poach rhinos. The players in the this category generally function as the expendable "foot soldiers" who risk their lives to illegally hunt rhino, but earn the least in terms of the value of the rhino horn.'[78] For this echelon, poverty is a catalytic behaviour driver, with locals from African communities being recruited due to proximity to protected areas and private game reserves.[79] Level 2 consists of higher functioning and better organised poachers 'who operate in better structured, mobile associations or gangs consisting of trackers and shooters that may move considerable distances to poach rhino in loosely organized situations, including across borders of neighbouring countries' as well as poaching gangs operating within game ranching comprised of professional hunters, veterinarians and other game industry operators targeting rhinos on other private properties.[80] These groups may also simultaneously function as low ranking buyers or local couriers. Level 3 represents 'middlemen buyers, exporters and couriers' who are typically African nationals operating within their countries of origin at the peripheries of national or regional supply chains.[81] These individuals operate 'through local and regional networks that procure horns through various channels, including pseudo-hunting, thefts, illegal private sector dehornings or unregistered stock sales.'[82] Level 4 individuals are those who illegally export rhino horns out of Africa to Asia and are often financially enriched enough to move between the two continents organising deals. These individuals are generally African-based, Asian operatives with permanent or long-term residency within key countries including South Africa. The activities of Level 4 players are facilitated by networks of corrupt 'collaborators' within the public and private sector.[83] Lastly, Level 5 encompasses buyers and consumers who are residents of foreign countries of receipt. These operatives 'control the delivery of the rhino horns into end-use markets and often foster corrupt relationships with government regulators to prevent disruption of the trade at ports of entry.'[84] TRAFFIC's intelligence gathering and profiling has contributed significantly to the understanding of wildlife crime and will no doubt provide bodies including the newly established Wildlife Justice Commission the opportunity to deliver impactful and evidence-based determinations of fact. What is more, the timing could not be more critical.

74 Ibid.
75 Ibid 18.
76 Ibid.
77 Ibid 17.
78 Ibid.
79 Ibid.
80 Ibid 17-8.
81 Ibid 18.
82 Ibid.
83 Ibid.
84 Ibid.

With the wildlife trade threatening approximately one third of birds and mammals worldwide[85] there is now a push to research the networks responsible to calculate a targeted and sustained response. Ayling's 2013 article *What Sustains Wildlife Crime?* presents a chief example of academic inquiry addressing these actor-networks, in particular focusing on their resilience.[86] The stark reality is that syndicates may very well be investing in extinction as a lucrative enterprise. The relationship between rarity and price was best articulated by Secretariat General of CITES, John Scanlon, whereby '[i]f something is rare it becomes more attractive…[a]nd the rarer something is, the more valuable it becomes.'[87] Evidence of the sheer reach of organised crime arises constantly and has become an ongoing theme in media reporting on the topic. A 2015 example from Mozambique offers one of many such instances, where only a few weeks following the country's most lucrative seizure of illegal wildlife products, four state officials guarding the stockpile were arrested under suspicion of aiding in the theft of 13 rhinoceros horns.[88] The following two parts of this paper will canvass some of the contemporary themes and issues in the dialogue addressing the illicit trade in rhinoceros horn before proffering some observations moving forward.

III CONTEMPORARY ISSUES

The challenges facing the five extant species of rhinoceros and those striving to protect them are formidable. In addition to the already multifarious range of problems examined in this paper, new trials have begun to surface from new uses and new markets for rhinoceros horn. A 2012 TRAFFIC report identified four user typologies in the then burgeoning Vietnamese market: the 'terminally or seriously ill' (for example, cancer sufferers), 'habitual users on the social circuit' (for example, affluent, middle-aged, conspicuous consuming, urban-dwellers who consume the horn as a supposed sexual enhancer, hangover cure, detoxifying agent, or as the chief ingredient in 'rhino wine'), 'protective young mothers' (who use the horn to reduce fever in infants and young children) and 'elite gift givers' (who gift the horn to increase their social capital as a means to socio-political mobility).[89]

Further, the rise of social media, anonymous online currency and 'Dark Net' markets have provided new means to obtain contraband goods from anywhere in the world. This was alluded to on the cover of American magazine 'Newsweek' (dated 11 July 2014) which

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85 Philippe Rivalan et al, 'Can bans stimulate wildlife trade?' (2007) 447 *Nature* 529, 529.

86 Ayling, above n 40.

87 Duncan Graham-Rowe, 'Endangered and in demand' (2011) 480 *Nature* 101, 103.

88 Manuel Mucari, 'Mozambique police seize 1.3 tonnes of poached rhino horn and ivory' *Reuters* (online) 14 May 2015 <http://uk.reuters.com/article/2015/05/14/uk-africa-poaching-mozambique-idUKKBN0NZ20I20150514>. The seizure resulted in the confiscation of 1.3tonnes of elephant ivory and rhino horn (340 tusks and 65 horns) from the residence of a Chinese national. The store room housing the haul was secured by a mere three padlocks. See also: Karl Mathiesen and David Smith, 'Thieves steal £700,000 of rhino horn from Mozambique police' *The Guardian* (online) 28 May 2015 <http://www.theguardian.com/environment/2015/may/27/thieves-steal-ivory-rhino-horn-mozambique-police>. Months later, in August, 2015, a large shipment of rhino horn and elephant tusks were seized in Vietnam. The shipment of 593kg of tusks and 142kg of rhino horn had arrived at Da Nang via Malaysia from Mozambique. 'Rhino horns, elephant tusks seized in Vietnam' *Inquirer.net* (online) 14 August 2015 <http://newsinfo.inquirer.net/712993/rhino-horns-elephant-tusks-seized-in-vietnam>.

89 Tom Milliken and Jo Shaw, TRAFFIC, *The South Africa-Viet Nam Rhino Horn Trade Nexus: A deadly combination of institutional lapses, corrupt wildlife industry professionals and Asian crime syndicates* (2012, TRAFFIC) 134-137. Contributions to the publication were also made by Richard H Emslie, Russell D Taylor and Chris Turton. As was noted by Ronald Orenstein, *Ivory, Horn And Blood: Behind the Elephant and Rhinoceros Poaching Crisis* (Firefly Books, 2013) 90, the Vietnamese government dismissed the entire 176-page TRAFFIC report as 'not objective and evidence-based,' suggesting instead that 'rhino horn is not used in Vietnam but rather it arrives in transit to a third country.'

identified 'facebook traders' as the newest threat to rhinos as well as by the International Fund for Animal Welfare (IFAW) in August 2015. IFAW reported that internet sites and private online forums including eBay, Craiglist, Baidu Bar, WeChat (China's version of Twitter) and QQ Group were being used to sell illegal wildlife products. [90] One such online trader, Yiwei 'Steve' Zheng, pled guilty to two counts of 'smuggling elephant ivory and illegally exporting rhinoceros horns from the United States in violation of the *Lacey Act*' on 14 January 2016. [91] The professor at St Cloud State University, Minnesota, who listed many of his items on eBay, agreed to a fine of US$500,000 and is awaiting sentencing set for May 2016. In 2014, IFAW analysed the online trade in 16 countries over a six-week period, finding over 33,000 internationally protected animals and items listed with a total value of US$11 million.[92]

The reality on the ground is also changing due to technological advances threatening *in situ* populations. In April 2015, it was reported that rhino syndicates were browsing the social media sites of tourists on safaris to track target species with the assistance of the geo-tags of images uploaded by smartphones.[93] This technological shift in the poaching toolkit has also become evident in the use of weaponry and machinery employed. In South Africa, rhinos are typically killed with AK-47 rifles however a growing number have been found bearing a single shot from the sort of high calibre weapons generally used by wildlife industry professionals, and less frequently darted with immobilisation drugs with their horns removed. [94] There has also been evidence of helicopters at crime scenes. [95] What is demonstrated here is that poaching has entered a new era facilitated by wildlife professionals including 'rogue game ranch owners, professional hunters, game capture operators, pilots and veterinarians.'[96] These new 'rhino wars' have resulted in heavy losses to non-human and human life alike, with poachers and anti-poaching patrols shooting-to-kill.[97] The anticipation of violence by

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90 Mary Catherine O'Connor, 'Inside the complicated world of online wildlife trafficking', *The Guardian* (online) 3 August 2015 <http://www.theguardian.com/vital-signs/2015/aug/03/cecil-lion-ivory-online-wildlife-trafficking-ebay>.

91 ' Scholar Pleads Guilty to Smuggling Ivory from US to China', *Macau Daily Times* (online) 15 January 2016 <http://macaudailytimes.com.mo/scholar-pleads-guilty-to-smuggling-ivory-from-us-to-china.html>. See also: Abby Phillip, 'Minnesota philosophy professor arrested for illegally trading rhino horns and ivory' *The Washington Post* (online) 1 April 2015 <https://www.washingtonpost.com/news/morning-mix/wp/2015/04/01/minnesota-philosophy-professor-arrested-for-illegally-trading-rhino-horns-and-ivory/>. While Zheng alleges that the goods were 50-100 years old, he had failed to obtain appropriate permits to trade under *CITES*. The elephant ivory and rhinoceros horn products documented were valued between US$550,000 and US$1.5m. In attempts to thwart customs officials, Zheng had labelled the materials as 'plastic' or 'resin.'

92 Damian Carrington, 'Wildlife crime study finds 33,000 items worth £7m for sale online', *The Guardian* (online) 25 November 2014 <http://www.theguardian.com/environment/2014/nov/25/wildlife-crime-study-sale-online>. The sixteen countries and their contribution to the total value are as follows: China (US$2.74m), Russia (US$1.95m), Ukraine (US$1.42m), France (US$1.35m), Germany (US$0.68m), United Kingdom (US$0.5m), United Arab Emirates (US$0.40m), Canada (US$0.39m), Qatar (US$0.31), Kazakhstan (US$0.27m), Belgium (US$0.27m), Kuwait (US$0.17m), Poland (US$0.14m), Netherlands (US$0.11m), Belarus (US$0.016m) and Bahrain (US$0.014m).

93 Andy Lines, 'Endangered rhinos and elephants hunted by Facebook poachers', *The Mirror* (online) 7 April 2015 <http://www.mirror.co.uk/news/world-news/endangered-rhinos-elephants-hunted-facebook-5475471>.

94 Milliken and Shaw, above n 89, 11.

95 Ibid.

96 Ibid.

97 For example, a shootout in Kruger National Park resulted in two poachers being shot by rangers: 'South African rangers kill two rhino poachers in Kruger National Park', *The Telegraph* (online) 5 January 2015 <http://www.telegraph.co.uk/news/worldnews/africaandindianocean/southafrica/11325513/South-African-rangers-kill-two-rhino-poachers-in-Kruger-National-Park.html>.

units was best summed up in a recent SBS report on the mostly female anti-poaching unit known as the 'Black Mambas.' Mamba Leitah Michabela, explains: '[i]f a person is attacking me, I know that person wants to kill me, then if I don't kill him first, he will kill me.'[98]

This progression in technology has also activated changes in the tactics employed by those on the front line to mitigate the unprecedented levels of harm. The Lindbergh Foundation's Air Shepherd Project is one such successful initiative, through its use of super-computer directed anti-poaching drones in Tanzania. Results from the Minnesota-based non-profit demonstrated a complete eradication of rhinoceros poaching over six months in South Africa's Hluhluwe Imfolozi Park in contrast to the prior rate of 12-19 deaths a month. The drones are directed by an algorithm developed by Professor Thomas Snitch which predicts where the rhinos will be at any given time with 93% accuracy as well as where poachers are most likely to strike.[99] Rangers patrol the park during the day whereas the drones patrol at night when most big-animal poaching occurs. A ground crew is stationed in the region equipped with a 3-D printer ready to create replacements parts for the drones as needed. British efforts are also breaking new ground, with Dr Paul O'Donoghue of Chester University creating RAPID (Real-time Anti-Poaching Intelligence Device), a system integrating heart rate monitors, horn cameras and satellite tracking devices to trigger a prompt and targeted response by rangers (pinpointed to the relevant location with a few metres). Rangers can be on scene via helicopter or truck within minutes and video from the horn cameras can be used as evidence against poachers.[100]

The law is incrementally adapting in some affected jurisdictions to capitalise on new equipment and tactics. The use of tracker dogs in Kruger National Park has seen a number of successful arrests and recently assisted in the conviction of two poachers. On 5 October 2015, Helene Eloff reported that a South African Local Magistrates Court had admitted a demonstration by a rhino poaching tracker dog and his handler as evidence for the first time. The now convicted poaching pair, Mozambicans Andelius Mukwebe and Jermano Thive, pled guilty to illegally entering the country but not to poaching despite being located hiding in vegetation 1.6km from a rhino carcass in the N'wantesi region of Kruger National Park in 2013, carrying two white rhino horns, an axe, a knife and sharpener.[101]

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98 SBS, 'Rhino Angels: World's first female anti-poaching unit', *Dateline*, 30 June 2015, (Evan Williams) <http://www.sbs.com.au/news/dateline/story/rhino-angels-worlds-first-female-anti-poaching-unit>. In September 2015 the Black Mambas were received the UNEP Champions of the Earth award.

99 Taylor Hill, 'Supercomputer-Powered Drones Shut Down Rhino Poaching in This Park- Can They Save Africa's Elephants Too?', *Takepart* (online), 9 March 2015 <http://www.takepart.com/article/2015/03/09/drones-shut-down-rhino-elephant-poaching>. The same algorithm is used to predict where insurgents will leave roadside bombs in Iraq and Afghanistan.

100 Ian Johnston, 'Rhino' horns to be fitted with spy cameras and alarms to help catch poachers', *The Independent* (online) 23 August 2015 <http://www.iol.co.za/scitech/science/environment/rhino-horns-to-be-fitted-with-cameras-1.1888188 >.

101 Helen Eloff, 'KNP Tracking dog's conduct noted in court', *Lowvelder* (online), 5 October 2015 <http://lowvelder.co.za/295966/knp-tracking-dogs-conduct-noted-in-court/>. The dog named 'Killer'was awarded a People's Dispensary for Sick Animals (PDSA) Gold Medal in January 2016, presented by British actor and animal welfare advocate Ricky Gervais. The Belgian Malinois has been in active service for four years and has been involved in investigations leading to 77 arrests. See also: Katie Grant, 'K9 Killer: Dog receives PDSA Gold Medal for helping to save rhino from extinction' *The Independent* (online), 8 January 2016 < http://www.independent.co.uk/news/world/africa/k9-killer-dog-receives-pdsa-gold-medal-for-helping-to-save-rhino-from-extinction-a6801611.html>.

Further, the execution of targeted intelligence-led strategies has garnered momentous results including two high profile 'ivory kingpin' arrests executed by the Tanzanian National and Transnational Serious Crimes Investigation Unit Task Force in October 2015. The first arrest was of Yang Feng Glan, otherwise known as the 'Queen of Ivory.'[102] Glan, a 66 year old Chinese National and fluent Swahili speaker who was secretary-general of the Tanzania China-Africa Business Council, has been charged with smuggling 706 elephant tusks worth approximately US$2.5m. The second arrest was of a direct supplier of Glan, Boniface Matthew Mariango, also known infamously as 'Shetani' or 'The Devil.'[103] Mariango became an active target of the Task Force in June 2014 and evaded capture on seven occasions. Evidence before the courts indicates that he managed over fifteen poaching syndicates across Tanzania, Burundi, Zambia, Mozambique and Southern Kenya, supplying them with weapons, ammunition and cars. Bolstering domestic efforts, INTERPOL has been active in guiding major operations internationally. Following the success of Operation Worthy in 2012 which saw the seizure of almost 2000kg of ivory and over 20kg of rhinoceros horn, INTERPOL reported on the success of Operation Worthy II on 22 December 2015 which produced 376 arrests, the investigation of 25 criminal groups, the issuing of 25 INTERPOL notices[104] and the seizure of 4.5 tonnes of elephant ivory and rhinoceros horn.[105]

Current debate around the poaching crisis has begun to centre on the development of an ethical and viable response, with the recurring common theme of harm minimisation. Strategies on the table include: poisoning rhinoceros horns or dehorning altogether as deterrence, conservation hunting, the legalisation of trade as well as meeting market demand with synthetic horn. The practice of preemptive dehorning has become more widespread to prevent poaching in both Asian (for examples in Assam)[106] and African populations (for example, Namibia).[107] In April 2013, South African game reserve Sabi Sand announced it had injected a mix of parasiticides and pink dye into over 100 horns over the course of 18

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102 David Smith, 'Chinese 'ivory queen' charged with smuggling 706 elephant tusks' *The Guardian* (online) 9 October 2015 < http://www.theguardian.com/environment/2015/oct/08/chinese-ivory-queen-charged-smuggling-706-elephant-tusks>.

103 Elephant Action League '"The Devil", most wanted ivory trafficker in Tanzania arrested' (Media Release, October 29 2015) < http://elephantleague.org/the-devil-most-wanted-ivory-trafficker-in-tanzania-arrested/>.

104 INTERPOL, *Elephant ivory and rhino horn trafficking targeted across Africa in Operation Worthy II* (Media Release, 22 December 2015) <http://www.interpol.int/News-and-media/News/2015/N2015-231>. The objective of Operation Worthy II was 'to enhance coordinated law enforcement responses to wildlife crime through cross-border, multi-agency collaboration, a systematic intelligence exchange and analysis, and the use of advanced investigative techniques.' A plethora of notices were issued internationally: seven Red Notices for wanted persons, four Blue Notices for information concerning individuals, ten Purple Notices for providing information on common modus operandi, and one Green Notice warning other nations of known criminals.

105 Ibid. Operation Worthy II involved law enforcement from eleven African countries (Ethiopia, Kenya, Malawi, Mozambique, Namibia, South Africa, Sudan, Swaziland, Tanzania, Uganda and Zambia) and operated between January and October 2015. Seizures also included 2,029 pangolin scales, 173 lives tortoises, 55kg of sea cucumber, warthog teeth, big cat, pangolin and python skins and impala carcasses, as well as 532 rounds of ammunition, five firearms and two home-made rifles. Investigative Support Teams were deployed to Singapore and Thailand.

106 Prasanta Mazumdar, 'Assam to dehorn rhinos to save them', *Daily News & Analysis* (online) 14 February 2014 <http://www.dnaindia.com/india/report-assam-to-dehorn-rhinos-to-save-them-1961855>.

107 Robert S Eshelman, 'Namibia Is Dehorning Rhinos to Combat Rising Poaching', *Vice News* (online) 14 October 2014 <https://news.vice.com/article/namibia-is-dehorning-rhinos-to-combat-rising-poaching>.

months to prevent poaching as consumption of the horn would cause serious illness.[108] In May of 2015, Texas Hunter Corey Knowlton won an auction for a hunting permit from the Namibian government to shoot an endangered black rhino (with a winning bid of $US350, 000). Since 2012 Namibia has sold five such licences claiming the money is spent on conservation projects and anti-poaching protection.[109] In May of 2015 it was reported that the Department of Environmental Affairs in South Africa was to establish a committee to investigate a potential licit trade in rhino horn. This push for a well-regulated legal trade in rhinoceros horn had been raised in the past, for example Leader-Williams notes that by 1992 the governments of South Africa, Zimbabwe and Namibia were not satisfied with the international trade ban.[110]In November 2015, South African judge Francis Legodi ruled in favour of game breeders John Hume and Johan Kruger to set aside the moratorium on domestic trade in rhino horns imposed by the government in 2009.[111] The government's appeal against the decision was rejected on 20 January 2016 by the North Gauteng High Court.[112] Finally, Biotech company Pembient and competitor Rhino Horn LLC both have current projects underway to manufacture 3-D printed imitation rhino horn for commercial use.[113]

It is imperative to locate these potential strategies, and indeed the issue as a whole, within the broader context of mass extinction to appreciate the urgency for sustainable solutions. A recent study conducted by Ceballos et al[114] confirmed that Earth has entered the sixth (Holocene) age of extinction. Unlike previous studies that have been criticised for being hyperbolic in their estimations of extinction rates, this study utilised conservative metrics so as to determine whether human activities are causing a mass extinction. That is, the study was designed to minimise evidence of mass extinction as measured against the rates prevailing in the five previous mass extinctions. The findings indicate that a sixth mass extinction is underway due to an 'exceptionally rapid loss of biodiversity over the last few centuries.'[115] The authors conclude, stating that '[a]verting a dramatic decay of biodiversity and the subsequent loss of ecosystem services is still possible through intensified conservation efforts, but that window of opportunity is rapidly closing.'[116]

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108 David Smith, 'South African game reserve poisons rhino's horns to prevent poaching', *The Guardian* (online) 5 April 2013< http://www.theguardian.com/environment/2013/apr/04/rhino-horns-poisoned-poachers-protect>.

109 Anna M Tinsley, 'Texas hunter Corey Knowlton shoots endangered rhinoceros in Namibia after winning auction', *The Sydney Morning Herald* (online) 21 May 2015 <http://www.smh.com.au/environment/animals/texas-hunter-corey-knowlton-shoots-endangered-rhinoceros-in-namibia-after-winning-auction-20150521-gh6874.html>.

110 Nigel Leader-Williams 'Regulation and protection: successes and failures in rhinoceros conservation' in Sara Oldfield, *The Trade in Wildlife: Regulation for Conservation* (2014, Routledge) 89-99, 92.

111 'South African judge lifts domestic ban on rhino horn trade' *The Guardian* (online) 26 November 2015 < http://www.theguardian.com/environment/2015/nov/26/south-african-judge-lifts-domestic-ban-on-rhino-horn-trade>.

112 'South Africa reports small decrease in rhino poaching, but Africa-wide 2015 the worst on record' *TRAFFIC* (online) 21 January 2016 <http://www.traffic.org/home/2016/1/21/south-africa-reports-small-decrease-in-rhino-poaching-but-af.html>.

113 Zoë Corbyn, 'Can we save the rhino from poachers with a 3D printer?', *The Guardian* (online) 24 May 2015 <http://www.theguardian.com/environment/2015/may/24/artificial-3d-printed-fake-rhino-horn-poaching>.

114 Gerardo Ceballos et al 'Accelerated modern human-induced species losses: Entering the sixth mass extinction' (2015) 1(5) *Science Advances* (forthcoming).

115 Ibid.

116 Ibid.

While these specific strategies are constantly being deliberated, conservation organisations globally have committed to meeting this newest age of extinction. The 2014-2015 period appears to have begun a new phase in the conservation movement, one which values public-private partnerships, intelligence gathering and analysis, community calls to action and innovative methods.[117] The IUCN World Parks Congress (held once every ten years) was held in Sydney to celebrate 50 years of the IUCN Red List and to launch the IUCN Green List. Conference delegates presented trail blazing advancements in including financial mechanisms such as 'Rhino Bonds' and the use of technology such SMART to monitor wildlife, threats, ranger performance and human activity to ensure decisions on the ground are well informed. Further on the subject of technology, a new intelligence gathering app called 'Wildlife Witness' was launched in April 2014. The app was developed in partnership between Taronga Zoo, Sydney and TRAFFIC enabling users to directly report illegal wildlife trade by taking a photo, geo-tagging the precise location and sending the data to TRAFFIC to be analysed by a Wildlife Crime Data Analyst to be used to inform enforcement decisions. As explained by Dr Kira Mileham (one of the architects of Wildlife Witness) tourists, particularly in South-East Asia are in a position to directly observe goods being placed for sale in markets and so possess capacity to make a difference.[118] Another example of Australia's recent involvement in global conservation efforts was announced by Ray Dearlove of the Australian Rhino Project who stated that government support had been received for the importation of rhinos from Africa for breeding insurance populations.[119] The 2014-2015 period has also seen the stories of individual rhinoceroses told to great effect in shaping the global public's awareness of the poaching problem. The popular international conservation conversation has shared all-too-familiar narratives of loss and, in rare cases, miraculous survival through traditional and social media. Some examples of these 'trending rhinos' now celebrated as ambassadors for their species include Thandi (and her calf Thembi),[120] Sudan[121] and Hope.[122]

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117 2014 also saw the passing of the father of rhino conservation in South Africa, Dr Ian Player on 30 November 2014.

118 Neil Keene, 'Taronga Zoo's high-tech solution to trafficking', *The Daily Telegraph* (online) 11 October 2014 <http://m.dailytelegraph.com.au/news/nsw/taronga-zoos-hightech-solution-to-trafficking/story-fni0cx12 1227086751097?sv=d7ed02f874b00ceec3162977b5996163>.

119 Sue Williams, 'Rhino Ray's War', *The Age* (online) 27 June 2015 <http://www.theage.com.au/good-weekend/rhino-rays-war-20150624-ghwcb5.html>. A recent web update by the Australian Rhino Project on 'Operation Rhino Drop' states that it aims to secure eighty rhinos in Australia to develop black and white rhinoceros insurance breeding herds (twenty individuals annually between 2016 and 2019).

120 ''Miracle' rhino calf named Thembi', *BBC* (online) 2 March 2015 <http://www.bbc.co.uk/newsround/31690291>. A female white rhino named Thembi was delivered at 8:50am on January 14th 2015 at Kariega Game Reserve, South Africa. The newborn's mother, Thandi, survived a brutal and bloody dehorning by poachers armed with machetes and chainsaws in March 2012 which left one unnamed bull dead at the scene and another, Themba, fighting for his life for 28 days.

121 Murithi Mutiga, 'At home with the world's last male northern white rhinoceros', *The Guardian* (online) 27 April 2015<http://www.theguardian.com/environment/2015/apr/27/ol-pejeta-kenya-sudan-worlds-last-male-northern-white-rhinoceros>. Sudan is the last male northern white rhino in existence. The 42 year-old lives at the Ol Pejeta Conservancy in Kenya under 24-hour armed guard. Females Najin and Fatu also reside at Ol Pejeta and are the only females in existence since the deaths of Nabire (Dvur Kralove Zoo, Czech Republic) and Nola (San Diego Zoo Safari Park) on 27 July 2015 and 22 November 2015 respectively.

122 Zi-Ann Lum, 'Young Rhino Named Hope Survives Brutal Attack After Being Left For Dead', *The Huffington Post Canada* (online) 26 May 2015 <http://www.huffingtonpost.ca/2015/05/26/rhino-poaching-south-africa-hope_n_7444060.html>. Hope was found in South Africa's Lombardini Game Farm days after her mother had been found dead. Both were shot with large-calibre rifles and dehorned. She has been receiving ongoing treatment, undergoing multiple procedures (including the fastening of an elephant hide as a shield for her wound) from Saving The Survivors after relocation to Shamwari Game Reserve.

IV WHERE TO FROM HERE?

Leader-Williams reflected on the primary mechanisms used to protect rhinos from poaching over the past quarter century and derived two main approaches: the first which dictates regulation to stop the international trade, and the second that attempts to protect rhinos *in situ*.[123] Whatever strategy is adopted, it must achieve extensive disruption of the illicit trade while educating the most prolific user countries against the use of rhinoceros horn. Mindful of these dual objectives, a 2015 study by Patel et al may hold the key. The study applied a nodal governance approach to identify which wildlife trafficking nodes to disrupt through law enforcement and public education policies, aided by the new online surveillance tool HealthMap Wildlife Trade which accumulates official reports, NGO reports and media coverage of global incidents. Patel et al researched elephant, tiger and rhino products to locate '(i) the key exporter, intermediary, and importer countries, and (ii) the countries where enforcement activities and educational campaigns might most effectively disrupt the networks'[124] The study found that disruption to the six most vital nodes for each species would result in disruption to: 89.5% of the network for elephants, 92.3% for rhinoceroses and 98.1% for tigers.[125] China, Vietnam, Thailand and India were also identified as the most important countries for educational programs. In particular it noted that 'with its increasing economic importance, China has to be a major focus for wildlife trade reduction to make a real impact.'[126] While the execution of resource efficient trade interventions appears to be the logical way forward, these must be supported by effective international and domestic regimes so as to not transplant the problem to other regulation-weaker nations. However, the question remains as to what will incentivise law and policy makers to construct and maintain a sustained response to the illegal trade in wildlife, given that the intrinsic value of species clearly has not served reason enough thus far. The tipping point may well be economic interest.

In moving forward, law and policy makers may wish to emphasise the economic and human impacts of the illegal trade in wildlife to build momentum for their reforms, particularly in nations relying on wildlife tourism in developing countries. A recent report from the United Nations World Tourism Organization found that wildlife watching constitutes 80 % of all African tourism (with sales increasing), with the most desirable animals being some of the most endangered (elephants, rhinos, cape buffalos, lions and leopards to name a few).[127] If the current poaching crisis continues and the market dries up, most jobs would not be absorbed into other industries (these jobs include: guides, hotel and restaurant staff, drivers and pilots and cultural performers). Echoing this fear, Tanzania's permanent secretary in the

123 Nigel Leader-Williams in Oldfield , above n 110, 89.

124 Patel et al, above n 17. Research analysed 232 shipments of elephants, 165 of rhinoceroses and 108 of tigers for the period August 2010- December 2013 following exclusion of reports with incomplete data or that did not involve international exchange (excluded reports totalled 153 shipments for elephants, 70 for rhinoceroses and 197 for tigers).

125 Ibid 3. The 'key sets of nodes for best fragmenting the illegal wildlife trade network' for each species surveyed are as follows: Elephant (China, Hong Kong, Kenya, Thailand, United States and Vietnam), Rhinoceros (China, Mozambique, South Africa, Thailand, United Kingdom and Vietnam) and Tigers (China, India, Laos, Myanmar, South Africa and Thailand).

126 Ibid 4. See also: Vincent Nijman and Chris R Shepherd, 'Trade in tigers and other wild cats in Mong La and Tachilek, Myanmar: A tale of two border towns' (2015) 182 *Biological Conservation* 1-7.

127 World Tourism Organization, Towards Measuring the Economic Value of Wildlife Watching Tourism in Africa- Briefing Paper (2014, United Nations World Tourism Organization) < http://dtxtq4w60xqpw.cloudfront.net/sites/all/files/docpdf/unwtowildlifepaper.pdf> 25.

Ministry of Natural Resources and Tourism, Adelhem Meru, stated that poaching will cost Africa 3.8 million jobs over the next 10 years.[128] Thus, even if one were to deny the proposition that wildlife possesses any intrinsic value, the inescapable economic value of the wildlife tourism industry cannot be discounted. A sustainable solution is required to ensure that the industry survives, and with it the likelihood that developing countries are able to meet their development targets.

The survival of the rhinoceros and other endangered species requires action from actors at every level of domestic and international governance, based on accurate evidence tendered from an interdisciplinary perspective; one mindful of the ecological implications of extinction, drivers of market forces (financial, social and cultural), criminological profiles of those who choose to breach laws, and the impact (or there lack of) of existing domestic and international regulatory systems. This paper sought to provide a contemporary snapshot of the illegal trade in wildlife using rhinoceros horn as a case commodity. While relentless demand continues to drive rhino poaching to unprecedented heights, this has been met by innovation and greater tenacity on the part of conservation actors, increased interest from the public, legal and criminological communities, and a sustained campaign of major policing operations. 2016 promises to be a pivotal year as the global community awaits the first ruling of facts by the Wildlife Justice Commission. How the Commission contends with the complexity of the problem as well as what action is taken in response to the information communicated may influence future regulatory responses, and hopefully generate more positive outcomes for human and non-human nature.

[128] John R Platt, 'Poaching Could Cost Africa Millions of Jobs', *TakePart* (online), 2 July 2015 <https://www.takepart.com/article/2015/07/02/poaching-could-cost-africa-38-million-jobs>.