Keeping the Horn on the Rhino: A Case Study of a Comprehensive Multi-Stakeholder Framework to Counter Poaching Threats

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Abstract

Since 2007, the numbers of rhino poaching incidents in South Africa have continuously risen, now averaging three rhinos per day. This development resulted in the need for comprehensive counter-measures to protect the remaining rhinoceroses, as well as additional research into the crime of rhino poaching to find more effective measures than a general "shoot-to-kill" policy. This study explores the Balule Rhino Conservation Model put in place at Balule Nature Reserve in South Africa. It outlines this one-of-a-kind project's aim for social change, environmental responsibility and education, and community involvement. By employing a triangulation of the Routine Activity Theory (Cohen & Felson, 1979), Rational Choice Theory (Cornish & Clarke, 1986), and the Situational Crime Prevention Theory (Clarke, 1997), this study aims to produce a better understanding of the crime of rhino poaching and how situational prevention measures can alter the cost-benefit equation of potential offenders. This study is based on participatory observation in the anti-poaching program at Balule Nature Reserve, which allowed examining the employed measures in their everyday context. Relevant stakeholders and partners of the program were interviewed. It examines the Balule Rhino Conservation Model's organizational design and the counter-measures currently employed, classifying them in a table of situational crime prevention techniques. This study assesses strengths and challenges of the Balule Rhino Conservation Model. It concludes that criminological theories, like Routine Activity Theory (Cohen & Felson, 1979) and Rational Choice Theory (Cornish & Clarke, 1986), aid in helping private nature reserves better understand the decision-making processes involved, as well aid in finding measures to alter offenders' cost-benefit analysis. The study makes several recommendations for additional measures to supplement the existing ones and provides some ideas for funding these measures.

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List of Abbreviations

APNR	Association of Private Nature Reserves
BRREP	Black Rhino Range Expansion Program
CEO	Chief Executive Officer
CITES	Convention on International Trade in Endangered Species of Wild Flora and Fauna
DCPI	Directorate for Priority Crime Investigation
EWT	Endangered Wildlife Trust
GDP	Gross Domestic Product
GKNP	Greater Kruger National Park
GPS	Global Positioning System
GIS	Geographic Information System
KNP	Kruger National Park
LEMA	Limpopo Environmental Management Act
NEMA	National Environmental Management Act
NEMBA	National Environmental Management Biodiversity Act
NEMPAA	National Environmental Management Protected Areas Act
OSCAP	Outraged South African Citizens Against Poaching
OWNR	Olifants West Nature Reserve
RRP	Rhino Rescue Program
SANParks	South African National Parks
SCPT	Situational Crime Prevention Theory
VHF	Very High Frequency
VIVA	Value, Inertia, Visibility, Accessibility
WCS	Wildlife Conservation Society
WWF	World Wildlife Fund

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1. Introduction

In December 2012, US Secretary of State, Hillary Clinton, illustrated in a keynote speech that wildlife trafficking has developed from a conservation issue to a national security threat, and advocates for the formation of regional centers of expertise and expanding law enforcement training in order to stem the current surge of poaching incidents (Braun, 2012; Rhino Mercy, 2013). Wildlife trafficking, as a form of transnational environmental crime, is a lucrative illicit endeavor, rivaled in size and monetary value only by the illicit trafficking in arms, humans, and drugs. Cristián Samper, CEO of the Wildlife Conservation Society (WCS) stated that the illegal trade in wildlife, timber, and fisheries is estimated at a value of approximately ten to 15 billion US dollars annually (Braun, 2012, para. 15). Poaching of animals, as a form of wildlife crime, has been identified as a threat to the livelihood of local communities, which depend on wildlife tourism for their viability.

The calls for a holistic and integrated approach to stem poaching and wildlife trafficking are manifold and have sparked new multi-stakeholder initiatives, as well as new nodes of government-private cooperation (Johannesen & Skonhoft, 2004; Poudyal, Rothley, & Knowler, 2009; Hauck & Sweijd, 1999). Nevertheless, in regard to the two local rhinoceros species, the surge in poaching numbers is unabatedly high, especially in South Africa.

The factors fueling the poaching of rhinos and other species are varied. Political instability in neighboring countries (Baral, 2013), like Zimbabwe, public mismanagement resulting in persisting poverty and hyperinflation (Artz, 2014), as well as a lack of other opportunities to earn a living have been identified as some of the fueling factors (Kvinta, 2014). Organized criminal syndicates operate largely undetected and undisturbed in South Africa, feeding the demand for illegal wildlife products by supplying the black market (Rademeyer, 2012, Chapter 7-15; Warchol, 2004). Employees of embassies have been implicated in trafficking wildlife or wildlife products in diplomatic shipments (Animal Rights Africa, 2009) and the sport hunting community has been complicit in arranging illegal hunts, so-called “pseudo hunts” (Rademeyer, 2012a). The name pseudo hunt seems appropriate, as these hunts usually entail someone posing as a hunter for the permit, someone else shooting the rhino, and the rhino horn being shipped as hunting trophy for export. Retribution and justice in the form of harsh

sentences has only been the rule in recent years, whereas before cases were often dropped and wildlife criminals merely received the proverbial slap on the wrist (Rademeyer, 2012b).

In South Africa, the poaching numbers concerning the two species of rhinoceros have climbed from a few rhinos per year to three rhinos a day currently, and the methods in poaching are becoming ever more sophisticated. Poaching syndicates pose a substantial threat to rangers, tourists, as well as local inhabitants. Additionally, these factors have also led to a shift in tasking of a warden from a pure conservationist and manager to a quasi law enforcement entity, and necessitated a whole new battery of counter-measures both in Kruger National Park (KNP), as well as the private nature reserves bordering it. Most of these measures are costly, i.e. GPS collaring, and the majority of funding for them is coming from charities and private donations.

With the significant rise in poaching numbers since 2007, and KNP and private nature reserves incurring the majority of the casualties, the identified need for counter-measures to tackle the phenomenon of poaching has sparked ample discussion among all stakeholders, especially those employed in conservation, law enforcement, and governmental institutions. Suggestions have entailed a "shoot to kill" policy concerning suspected poachers (Leader-Williams & Milner-Gulland, 1993; Messer, 2000; Messer, 2010; DeFranza, 2010) and the most recent, and extremely polarized debate whether to legalize the trade in rhino horn to flood the market with horns from stockpiles (Sharife, 2013; Ammann, 2013; Biggs, Courchamp, Martin, & Possingham, 2013; Sills, 2013).

This study explores if and how established criminological theory can aid in producing a deeper understanding of the crime of rhino poaching, whether these theories are applicable for this form of environmental crime, and to what extend the measures employed at this particular private nature reserve can be classified as situational crime prevention techniques. The study commences with an analysis of the phenomenon of rhino poaching using the Routine Activity Approach (Cohen & Felson, 1979), Rational Choice Theory (Cornish & Clarke, 1986), and Situational Crime Prevention Theory (Clarke, 1997). After a threat assessment for the site of research, the study will describe the organizational design of the multi-stakeholder anti-poaching initiative at Balule Nature Reserve, a medium size reserve in the Greater Kruger National Park (GKNP) area. It will be explored how this initiative not only aims at directly and successfully countering poaching threats, but also to spark social change, and upliftment and increase community involvement. The study continues with the evaluation and classification of the

employed measures in Clarke's (1997) framework of situational prevention techniques. Moreover, it will evaluate the most obvious strengths and challenges of this anti-poaching initiative. The study closes by outlining several recommendations and suggestions for additional situational prevention measures, which could supplement the existing ones, as well as ideas on how to finance these additional measures.

2. Methodology of the Research

In order to analyze what measures are currently employed at Balule Nature Reserve, particularly the Olifants West Nature Reserve (OWNR), and to examine in which ways the initiative aims to promote social change and community involvement, it is necessary to thoroughly relate the applied measures to established criminological theory. In order to accomplish this and provide a sound theoretical background for the present study, the theoretical framework triangulates different perspectives from a criminological standpoint. For the purpose of this study, in order to better explain the factors, which influence and exacerbate the poaching problem, Cohen and Felson's (1979) Routine Activity Approach seemed a suitable choice to examine the tempo-spatial convergence of crime factors for rhino poaching. Poaching of rhinos, as a predatory crime, similar to other predatory crimes, occurs in a tempo-spatial conjunction of the three conditions Cohen and Felson (1979) elaborated in their Routine Activity Approach: (1) a motivated offender, (2) a suitable target, and (3) a lack of capable guardians. A second theoretical baseline used to analyze what Clarke (2000) called "the meso sphere" (p.97) of poaching has been found within Rational Choice Theory (Cornish & Clarke, 1986) as it examines offenders' cost-benefit analysis against "various situational influences" (Clarke, 2000, p. 97). Lastly, as a theoretical concept for studying the micro sphere of poaching and the individual measures employed at Balule Nature Reserve, and Olifants West Nature Reserve (OWNR) in particular, the concept of Situational Crime Prevention Theory will be employed. Cohen and Felson's (1979) Routine Activity Theory, which will be described in detail later in this study, has previously been successfully utilized to better explain and understand the phenomenon of (sustenance) poaching, i.e. in a study by Herbig and Warchol (2011).

The triangulated theoretical approach used for this present study benefits not only the general understanding of the poaching phenomenon concerning rhinoceroses, it also illustrates a more complete picture than looking at only the situational context and prevention methods at the chosen nature reserve. Furthermore, it is hoped that this study will facilitate the duplication of the employed comprehensive initiative in other locations and reserves, in accordance with the respective needs and situational factors at hand. Lastly, in order to be able to relate criminological theory to the organizational framework and the employed measures, participatory observation is employed as a method of data collection, gathering data from the anti-poaching program and the counter-measures in their situational context (Becker & Geer, 2009). The

observations during the time in the field were recorded in field notes (Dewalt, Dewalt, & Wayland, 2010). During the time of on-site research, multiple interviews with relevant stakeholders and partners of the anti-poaching initiative were conducted. This method of data collection resulted in the opportunity to cross-reference the data collected through participatory observation with the relevant results from stakeholder interviews and allowed to eliminate possible bias. The use of these two data collection methods has proven particularly useful in order to mitigate shortcomings of any of these methods employed singularly, and thereby supplied a more detailed, comprehensive dataset for evaluation (Becker & Geer, 2009, p. 28, 32; Dewalt et al., 2010, p. 293).

2.1 Research Site and Timeframe of Research

The site of the field research is situated in Balule Nature Reserve in the Maruleng municipality of the Limpopo Province, located in northeastern South Africa. The reserve is an initiative of various landowners, resulting in a reserve, which is fenceless on the inside. It is a continuously expanding, medium-sized reserve of approximately 50,000 hectares of bush (approximately 500 square kilometers), located on the western edge of the Greater Kruger National Park (GKNP) area.

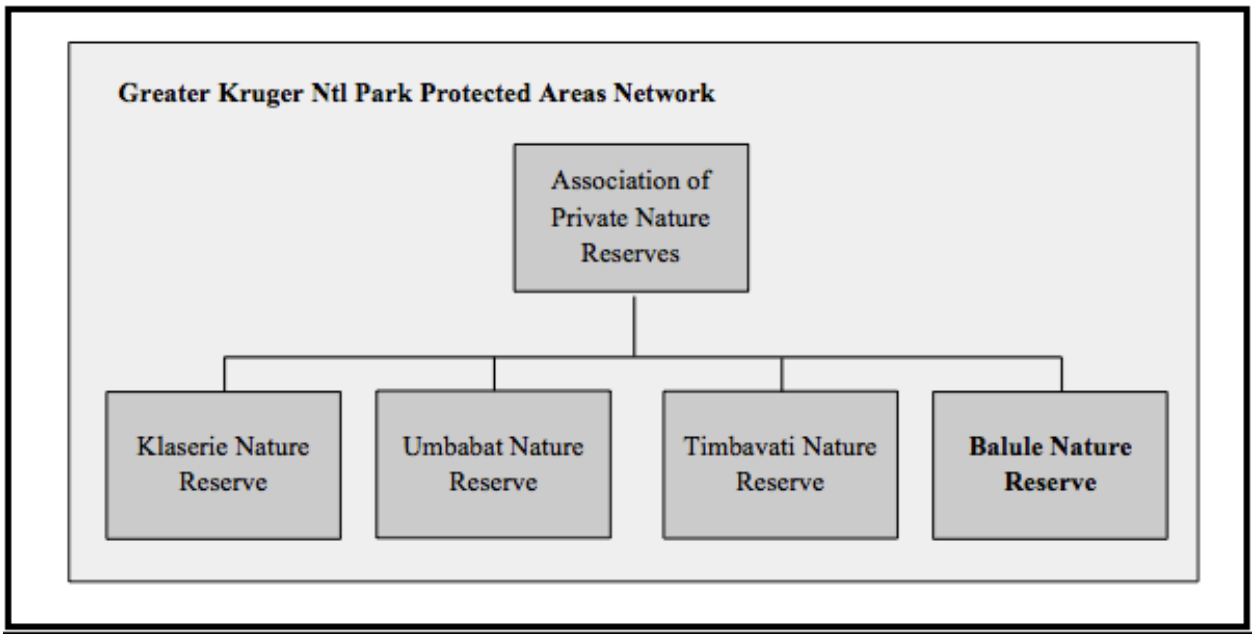

Figure 1 - Hierarchical tie-in of Balule Nature Reserve in the APNR in South Africa (© E. Reuter, 2014)

As shown in figure 1 above, Balule Nature Reserve is part of the GKNP Protected Areas Network and the Association of Private Nature Reserves (APNR). Timbavati Nature Reserve and

Klaserie Nature Reserve border the reserve in the east, which then tie into Kruger National Park (KNP) further to the east. All of these reserves are not only fenceless on their KNP border, but also there are no fences separating them from each other within this area. This is generally beneficial for wildlife movement and the eco-system in all of these reserves. Nevertheless, this fact also presents the actors in the anti-poaching arena with various governance challenges, i.e. no markings of where old fence lines were, transitioning out of their area of jurisdiction, cooperation between different anti-poaching entities, and coordination of joint operations.

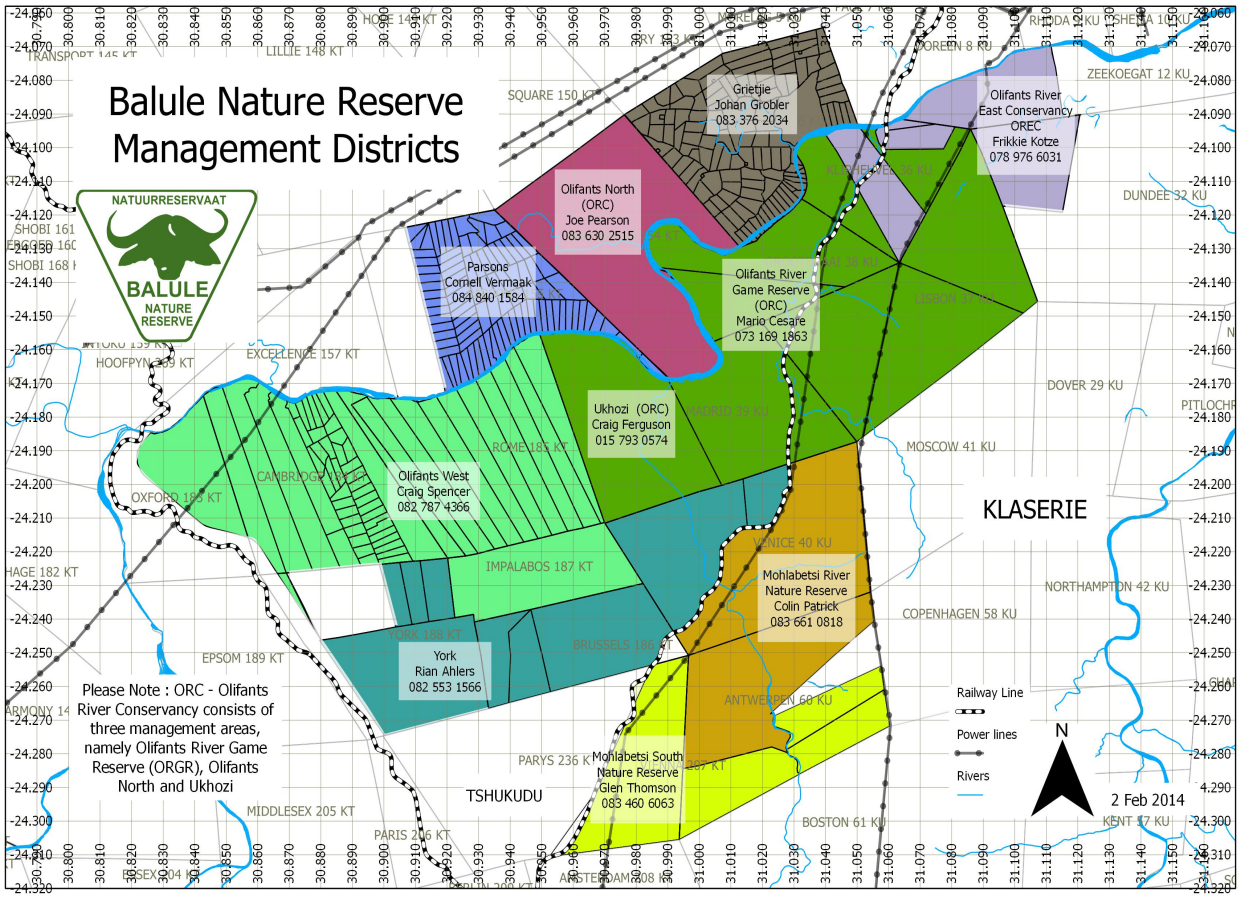

Figure 2 - Map of Balule Nature Reserve Subsections (© S. Bosman, 2014, received via personal communication on 14 February, 2014)

Figure 2 above shows that Balule Nature Reserve is currently divided into nine management sections: Parsons (PNR), Olifants North (ONNR), Gritjie (GNR), Olifants East (OENR), Olifants River (ORNR), Olifants West (OWNR), York (YNR), Mohlabetsi River (MRNR), and Mohlabetsi South (MSNR). One warden individually manages each of the subsections. The

wardens coordinate their conservation, reserve, and tourism management efforts, as well as anti-poaching measures, and report to the Head Warden of Balule Nature Reserve.

The reserve is home to the big 5[1] and, being fenceless, animal populations tend to traverse in and out of the area. Olifants West Nature Reserve (OWNR) in the western-most region is home of the Indlovu Research Camp, hosting local and international researchers from the field of ecology, biology, entomology, and wildlife and conservation management through Craig Spencer's non-governmental organization (NGO) Transfrontier Africa (TA). Balule Nature Reserve itself, as well as the surrounding area, has been targeted by poachers and lost rhinoceroses in poaching incidents (T.L. Tochterman, personal communication, March 31, 2014). After identifying a need for a comprehensive response, OWNR, in partnership with Rhino Mercy, Transfrontier Africa (TA), Pro-Track, Endangered Wildlife Trust (EWT), and South African National Parks (SANParks) created a local initiative to counter poaching threats.

2.2 Data Sampling and Collection

For the purpose of this study, six weeks of field research of participatory-observatory nature within Balule Nature Reserve are the basis of data sampling and collection. This provided the opportunity to directly observe and participate in the employed measures on a day-to-day basis for the time of field research. Additionally, to further enrich the data collected through participatory observation (Becker & Geer, 2009; Dewalt et al., 2010), interviews with stakeholders who are directly involved in this collaborative multi-stakeholder initiative were employed as method of data collection. The stakeholders interviewed include participants from

- Rhino Mercy (Tom Tochterman)
- Balule Nature Reserve/ Olifants West (OWNR, Craig Spencer)
- Balule Nature Reserve/ Olifants West (OWNR, Stefan Bosman)
- Balule Nature Reserve / Parson (PNR, Cornell Vermaak)
- Balule Nature Reserve/ Joint Operation Center (YNR, Rian Ahlers)
- The Black Mambas Anti-Poaching Unit/ APU
- Armed Response and Tactical Unit
- Pro-Track (Vincent Barkas)
- SANParks/ Lawyer (Coert Joordan)

[1] Big 5 – The big 5 animals of Africa are the African elephant, the lion, the leopard, the rhinoceros, and the African buffalo (SafarisAfrica, 2014)

- Outraged South African Citizens Against Poaching /OSCAP (Allison Thomson)
- Endangered Wildlife Trust/ EWT (Kirsty Brebner)
- Rhino Rescue Program/ RRP (Dr. Lorinda Hern)
- Ezulwini Game Lodges (Lauren Saad)

The interviews were conducted in order to identify what the different perceptions of risk and challenges are for each stakeholder in their respective area, to examine what measures are employed, and whether and how they respond to the situational needs for the Balule Nature Reserve area. The interviews were tailored to the respective stakeholder, including the guarantee to confidentiality where asked and needed, i.e. for the interview partners from the Armed Response and Tactical Unit, as well as the Black Mambas APU. Therefore, purposeful sampling has been identified as the most suitable sampling method for this study and is employed herein. While there is the awareness that the sampling techniques may lack representativeness as standalone methods (Becker & Geer, 2009), purposeful sampling offered the freedom to choose interview partners who are directly involved in the preparation, design, execution, and assessment of the employed measures, as well as those actors who complement this framework of private-governmental partnership.

2.3 Limitations of the Research

Due to the scope and aim of this research, the study was faced with a number of limitations. The focus of this study is of qualitative nature. It analyzes the organizational design of the anti-poaching initiative, as well as what measures are employed at Balule Nature Reserve to counter poaching threats. The analysis entails how the measures respond to the situational context and can be classified as measures of Situational Crime Prevention Theory. Moreover, the analysis also explains how these measures aim to alter the cost-benefit analysis a potential offender has to perform by relating it to Cohen and Felson's (1979) Routine Activity Theory and Cornish and Clarke's (1986) Rational Choice Theory. The aim of this study has not been to show whether the employed measures are effective. This research focus was chosen due to the fact that the employed measures have been in place less than one year and statistically sound data to analyze effect and efficacy of the measures are not yet available. However, this may be one of the suitable lines of inquiry for research in the future, as well as it is surely possible currently to indicate a first trend of what measures seem to be more promising than others.

Furthermore, one limitation of the research can be found in representativeness due to the chosen research design. The study specifically inquires about the measures employed at Balule Nature Reserve. The validity and applicability of the findings towards other situations and locations has to be cautiously weighed against criminological theory and the local situation in question.

While all of these methods of data collection are vulnerable to bias, the results have been cross-referenced with observations and experiences collected while participating in the employed measures in order to eliminate as much bias as possible. This allowed for a critical assessment of the poaching situation at Balule Nature Reserve, of what measures are employed, and what their aim is in relation to situational crime prevention (Clarke, 1997), Rational Choice Theory (Cornish & Clarke, 1986), as well as the Routine Activity Approach (Cohen & Felson, 1979).

Another limiting factor of this study can be found in the aspect of time. The timeframe for the field research was set at six weeks and, therefore, the collected data can only be regarded as a snapshot. Due to the measures being implemented, and in effect on an ongoing basis, the spatial conditions for this reserve are not only unique, but also variable and mutable. With the pursuit of the countermeasures, the landscape of the poaching threat may vary for this location in the future. Despite the fact that the study is not exhaustive and all-encompassing, valuable conclusions in respect to criminological theory and the problem of rhino poaching emerged and sparked hopes that this study may aid in creating similar frameworks in other locations.

Rather for reasons of confidentiality, than limitation, this study purposely does not reveal any data considered to be sensitive. This pertains as much to rhino population numbers, as well as numbers of manpower, deployment and picket sites, and tactical set-ups. It is the explicit aim of this study to not jeopardize the program under examination, as revealing such data would not only consist in a breach of confidence, but might result in rendering the measures in place ineffective, as they could be circumvented. Furthermore, during the study it became apparent that reporting the quantity of personnel, as well as rhinos, was neither necessary, nor relevant.

3. Theory and Definitions

3.1 Introduction

Until recently, poaching has been considered a problem with which scholars in the field of conservation and ecology concerned themselves. However, more currently and with the development of a "conservation criminology framework" (Gibbs, Gore, McGarrell, & Rivers III, 2009), wildlife crimes, and poaching in particular, have sparked substantial research interest in the field of criminology. Conservation criminology is therefore a relatively young field of study with diversified foci and topics of inquiry. Wildlife crime and poaching, as one form of manifestation, are just one of the many interests of the conservation criminology field. While crime in general is defined by society's morals and values, and effectively is the definition of what actions are deemed reprehensible, White (2008) pointed out that it is the criminalization of environmentally harmful acts through society, which possesses definitional character and "how criminal justice institutions respond to such harms" (White, 2011, p. 6). Hence, governmental actors possess the monopoly of defining what is to be considered harmful, criminal and illegal, and they can, where deemed beneficial, spare certain groups of perpetrators from prosecution.

Nevertheless, it is debated within society and scholarship why there is a need to prevent, investigate, and punish environmental crimes. Humanity has displayed unsustainable behavior and desires in their use of the environment and its resources since the beginning of its existence (Oskamp, 2000), which has led i.e. to the extinction of species and the pollution of entire ecosystems (Milhollin, 1979, p. 1; South, Brisman, & Beirne, 2013, Chapter 1). Most of these actions can be attributed to historical and cultural developments and traditions, i.e. hunting, but also to acts of negligence by corporate and private entities (Faure, 2009). It is beyond dispute that these acts have resulted in overuse and overexploitation of resources (World Conservation Monitoring Centre, 1990), and highlighted a need for regulation.

The field of conservation criminology tries to research, prevent, investigate, and prosecute environmental crimes out of a need to preserve what is left for future generations, as well as out of a moral obligation to ameliorate and mitigate the results of unsustainable human desires and behaviors. We, as the human race, have caused these problems through our actions, whether they pertain to polluted eco-systems and bodies of water, or the extinction of species and declining biodiversity. We have set into motion permanent, harmful changes to our own surroundings, and it may very well be detrimental and fatal for the human race at a future point

in time. Therefore, in order to preserve the eco-system we live in as a whole, regulation and sanctioning of harmful behavior is very much needed (White, 2010).

This realization has led to the criminalization of environmental crimes and set into motion countless initiatives on the local, national, and international level to prevent, investigate, and prosecute these actions. For the realm of wildlife crime, and rhino poaching in particular, there is no doubt, that it is an illegal, criminal act, which is harmful to society and the animals themselves.

Nevertheless, the notion of harm in this context cannot be easily attributed, as can be done with crimes of theft or bodily harm when committed in a human vs. human relationship. Surely, these animals experience tremendous suffering, harm, and loss of life at the hands of criminals, however they are not considered victims per se in the judicial sense of the term. They are legally regarded as property instead of as individuals. Due to this fact, the victimization is legally transferred onto present and future populations of humans, who will lose these iconic animals through extinction, as well as the income from (eco-) tourism connected to this particular species.

However, this is a typical anthropocentric definition of harm. Beirne (2013) and Sollund (2013), among others, contributed substantial research on animal rights to the field of criminology, and criticized this anthropocentric definition. Most impressively, they both argue against the terminology currently in use, i.e. the terms “animal” and “human”. Their criticism extends to the point that even the human race can be considered an animal, however highly evolved. To juxtapose the terms human and animal implies that “they were different in aspects which are important in attributing rights or capacities such as intelligence, sentience and morals and the ability to feel pain and pleasure” (Sollund, 2013, p. 2).

Opposing the presented juxtaposition of terminology would mean that the notion of harm could indeed be directly attributed in the case of rhino poaching if animal rights existed in the form for which Sollund (2013), Beirne (2013) and others advocate. Furthermore, Beirne (2013) coined the term “theriocide” for the killing of animals by humans in lack of a comprehensive term for this act (Beirne, 2013, p. 63). The fact that there currently is not a term for these acts, other than “theriocide” suggested by Beirne (2013) makes evident the priority this issue takes in society and underlines the notion of “it is just an animal”. The current state of affairs concerning

rhino poaching is far from according rights to these animals, or any kind of species justice for that matter, however a desirable future situation this may be.

Moreover, humanity is currently still grappling with establishing and assuring the enjoyment of human rights around the globe, despite the existence of the UN Declaration of Human Rights. It may just be an impossible goal to postulate the establishment of animal rights and species justice in this form and at this point in time. Additionally, looking at the development of humanity, this process has always taken place via (ab-) using the immediate environment in which it exists. The human race, as a hunter-gatherer-society, has always elevated itself over other animals by hunting them, domesticating them, and otherwise using them for their own benefit. Following Sollund's (2013) conclusion, to demand the renunciation of eons of historical development and custom may be unrealistic and asking too much at the moment. However, this is not to say it is impossible, but rather that this development will need a lot of time and may come as too little too late for some non-human species.

For the purpose of this study, wildlife crime is defined in a legalistic perspective as "the taking, trading, exploiting, or possessing of the world's wild flora and fauna […] in contravention of national and international laws" (Interpol, 2010). This choice of definition reflects the current legal perspective, as not only is South Africa a founding party to the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES) since its creation and ratification in 1975 (CITES, n.d.), but there are also national laws in South Africa, which are applicable in relation to rhino poaching, namely criminal and environmental law.

However, the determination of which law is applicable first depends on the status of the area in which it is committed. While national parks and other protected areas fall under the National Environmental Management Protected Areas Act 57 of 2003 (NEMPAA), private game farms do not. Locally, for Balule Nature Reserve the Limpopo Environmental Management Act 7 of 2003 (LEMA) is one applicable legal resource, in addition to the National Environmental Management Act 107 of 1998 (NEMA), National Environmental Management: Protected Areas Act 57 of 2003 (NEMPAA) and the National Environmental Management: Biodiversity Act 10 of 2004 (NEMBA) on the national level. NEMBA outlines a variety of restricted activities, of which poaching is one. Possible penalties of violations under the regulations within NEMBA can result in prison sentences up to ten years and/or a fine of up to 10,000,000 ZAR (The Law

Library, 2014, expression III), which equates to roughly 680,500 Euros. While this sounds like harsh sentencing, the key words here are "up to", at least regarding to the amounts of a fine. Furthermore, rhino poachers will be charged with violations under the Firearms Control Act 60 of 2000 and its subsidiary legislation of 2004 (The Law Library, 2014).

Additionally, taking into account that CITES is not a legal document per se, it is however designed and intended to promote national legislation according and concurrent to its content. Moreover, CITES is not intended to prohibit or prevent the trade in species, but rather to regulate it via the issuance of permits and documentation. Therefore, rhino poaching, while also a CITES violation when carried out against its statutes, is herein first and foremost considered a national crime violating South African legislation, namely NEMBA, NEMA and NEMPAA.

Furthermore, for the purpose of this study poaching is defined legalistically as "the illegal hunting, killing, capturing or taking of wildlife violating local or international wildlife conservation laws" (US Legal Inc., 2001-2014, p. 1). These two choices definitions are foremost due to the theoretical background of this study, which analyzes poaching of rhinoceroses as a criminal act.

Notwithstanding this legalistic approach is the awareness of these crimes having harmful consequences on a social and economic level, as well. A large part of South Africa's tourism industry denpends on the visibility and existence of wildlife on its territory. Moreover, the tourism industry "supports one in every 12 jobs in South Africa" (Brand South Africa, n.d., para. 5). Tourism, and the income generated from it, may seriously decline when armed contact with poachers during a visit is to be expected, and safety for visitors cannot be guaranteed. Hence, if poaching continues to threaten the existence and visibility of wildlife in South Africa, it will have major implications for the South African tourism industry, employment opportunities in this field, as well as all other fields associated with it, and impair the progress of desired social development. Essentially, if South Africa loses their tourism sector due to poaching and extinction of certain species, it also loses a substantial portion of its annual gross domestic product (GDP).

3.2 The Emerging Concept of Conservation Criminology

There are a variety of names for this fairly new field of empirical research, i.e. green criminology (Lynch & Stretsky, 2003), environmental criminology (White, 2003), and, lastly and most fittingly, conservation criminology (Gibbs et al., 2009). It has been developing mainly in

the last decade and the terminology in use continues to vary. While some scholars see it fit to call the field "green criminology", this terminology has political implications and relates this field, perhaps inadvertently, to the political movement deemed "green" (Gibbs et al., 2009). Other scholars prefer to use the term "environmental criminology", which in turn extends the field so broadly that it is nearly impossible to distinguish it from other, more traditional sciences, and forces the inclusion of natural catastrophes resulting in harmful conditions for the human race (Gibbs et al., 2009). Also, the traditional Chicago school of research in sociology and criminology coined the term environmental criminology (Menna, 2008). In this case, environmental means that research focuses on the spatial, contextual and immediately surrounding situational factors that can influence criminal activity, and not the environment in regard to nature. It does not necessarily concern itself with criminal, environmental harm. Therefore, it may be misleading to use the term "environmental criminology" to describe this field of study.

Conservation criminology is considered an interdisciplinary field of study (Gibbs et al., 2009), uniting scholars from conservation, criminology, sociology, law, ecology, risk analysis, politics, and policy analysis. In accordance and agreement with Gibbs et. al. (2009), the proposed terminology to be used for this study will be "conservation criminology". This chosen terminology removes the otherwise associated connotations, be they politically inclined, extending, or limiting, and in turn emphasizes the multidisciplinary approach provided by the conservation criminology framework.

Traditionally, the field of criminology dealt with phenomena of crimes of mass occurrence, like theft and other property crimes, and created an outpouring of prevention strategies designed to combat these. However, like in most sciences there are competing views on how to best explain the matter at hand.

Some criminological theories focused on individual decision-making processes leading to deviance, as well as the social and familial background of potential offenders in order to prevent crimes. Some theories even suggested a genetic disposition and heredity of crime (Walters & White, 1989), as well as, in earlier times, the use of physical features to predict criminal behavior (Lombroso, 1876), which served as a base for Nazi Germany's racist policies. Contrasting the anthropocentric approach in order to explain criminal behavior presented above, is the Chicago School of Criminology mentioned above.

The Chicago School of Criminology focused on society, socialization, and situational factors and influences in order to explain criminal behavior (Menna, 2008, para. 1), most famously i.e. the theory of Social Disorganization (Menna, 2008, para. 2) and Social Learning Theory (Menna, 2008, para. 5). The emerging field of conservation criminology in this regard, seeks to examine the linkage between a group of possible offenders and crime opportunities, with a focus on criminal environmental harm and the situational context of these crimes. Hence, the focus on opportunities and situational context is not new, however, it is now employed towards studying crimes in this fairly new field.

It is one of the accepted finding from previous research (Pires & Clarke, 2012; Pires & Moreto, 2011; Clarke & De By, 2013) that environmental crime possesses structures similar to other crimes, which makes the already developed criminological theories an applicable tool in order to better understand these phenomena now under scrutiny. Poaching, as a form of wildlife crime, has only recently come into the focus of criminological research, most famously in the research of Prof. Dr. Ronald Clarke and his students at Rutgers University, Newark, NJ (Rutgers University, n.d.).

Rhino poaching in particular has been analyzed in various studies, but has seldom been related to and examined utilizing established criminological theory. Herbig & Warchol (2011) chose to examine subsistence poaching using the Routine Activity Theory, and thereby contributed to the understanding of why game reserves and protected areas are continuously violated by poachers. Therefore, this present study in the field of conservation criminology may likewise aid to better understand the poaching phenomenon concerning rhinoceroses in game reserves in South Africa and the decision processes involved, taking into account the situational context and how to counter it. It furthermore aims to support the development of multi-measure/multi-stakeholder frameworks to address the identified risks and vulnerabilities for private nature reserves.

When this situation-focused approach emerged in the field of criminology, it was a novelty, and it shifted the focus of study away from centering on the offender, and towards the situational context in which the offender acted. As a result, criminological research identified the importance of the situational context when it comes to crime, which brought about the realization that measures altering the situation in question may be suitable to prevent crime from happening. At first, these approaches were mainly used in understanding and preventing ordinary street

crimes, i.e. burglary and car theft, but they have also subsequently, and more recently, been applied in conservation criminology, and wildlife crimes in particular. The present study is based exactly on this premise: the assumption that any strategy to fight rhino poaching in private nature reserves will have to target the situational vulnerabilities and the offenders' cost-benefit analysis in order to provoke a serious decline in incident numbers. Furthermore, the employed measures will have to address the situational context of the given reserve and will have to be constantly adapted and amended to the changes they produce.

3.3 The Routine Activity Theory

Cohen and Felson (1979) studied crime rate trends in the post World War II United States of America employing the "Routine Activity Theory". They based their research on the premise that crime is the result of a convergence of three basic factors over space and time: (1) a motivated offender, (2) a suitable target, and (3) the absence of capable guardians. Furthermore, they investigated how major changes in society and its routine activities influenced crime rates at the time, as well as in themselves created opportunities for the spatial and temporal convergence of the three base factors (Cohen & Felson, 1979, p. 589).

Their research did not investigate why individuals are criminally inclined, but rather accepted this condition as a given. They found that crime itself is a, albeit illegal, routine activity which feeds on other, legal routine activities (Cohen & Felson, 1979, p. 589). According to Cohen and Felson's (1979) findings, the motivated offender is a necessary component for crime to take place, especially when considering direct-contact crimes of commission. The lack of this basic factor results in no crime being committed.

In using the Routine Activity Approach to analyze the macro sphere of the crime of rhino poaching, it is herein regarded as a direct-contact crime of commission, as the offenders have displayed brutality, cruelty, and violence during its commission. In what follows, the Rational Choice Theory will deal in more detail with the decision-making process of a potential offender and his cost-benefit analysis.

Cohen and Felson's (1979) research assessed the suitability of a target using the following variables: Value, Inertia, Visibility and Accessibility (VIVA). When assessing the rhino horn's suitability as a target using the same criteria (VIVA), one finds that it is highly valuable on the black market, currently priced at 65,000 USD per kilogram (Rhinomercy, 2014, para. 1). It is also easily concealed and transported at an average weight of four kilograms per

horn, once it is removed from the animal. The visibility of the target, namely the horn when it is still on the animal, in this case is dependent on a variety of factors. Firstly, the size of the property where the rhinos are kept is a factor not to be underestimated. Ten rhinos are much less likely to be visible on a reserve of 25,000 hectares than on a small game farm of 250 hectares.

Another factor in order to assess target visibility may be found in the distinct differences in terrain preference of the rhino species. While the African White Rhinos are grazers and inhabit lower plains and grassy savannahs, the African Black Rhinos are browsers and seem to prefer wooded, rocky mountain terrains for habitat. Therefore, the White Rhino is much more likely to be more easily spotted. Other determining factors could for example be the location of the reserve, whether there are communities located within the reserve, rhino population density, how many water sources there are on the reserve, and the regularity of animal migration to these water sources. Lastly, the variable of accessibility deserves consideration. In fact, it is not only the factual accessibility of the target that needs to be taken into account, but also the perceived accessibility due to the fact that the offender will take this perception into account during his decision-making process to commit the offense.

Also, the factor of accessibility is closely connected to guardianship, or the lack thereof. At present, the reality at private game reserves is such, that they are usually guarded, yet widely accessible to the public. They are not closed-off enclaves and their purpose is not to exclude and dissociate themselves from their surroundings. Lodge operators, tourists, building and maintenance contractors, as well as family and friends of personnel on the reserve generally enjoy access to the reserve, and therefore, have access to the animals as well.

The accessibility of the target is further increased in situations of self-drive safaris. It is suspected, that potential offenders have to engage in a certain amount of reconnaissance before embarking on actually committing the crime. The scouting of a potentially suitable target could therefore very well happen during the day and by gaining legal access to a reserve. Hence, the accessibility of rhino horn as a target by legal, as well as illegal means is a reality in the current poaching crisis. Rhino horn is therefore classified as a suitable target following Cohen and Felson's (1979) classifications.

The last basic factor in Cohen and Felson's (1979) Routine Activity Theory is the absence of capable guardianship. The absence of capable guardianship can be as much a perceived absence, as a factual absence. Yet, the more important factor for the offender and his

decision-making process is the perceived absence of capable guardians, as this will lead to the expectation of being able to successfully commit the crime. Cohen and Felson (1979) in their research emphasize that guardianship is not to be regarded as a task solely owned by governmental agents. They emphasize that guardianship can be executed by anyone, i.e. alert neighbors, family members or the average public (Cohen & Felson, 1979, p. 590). Hence, it should be in the inherent interest of reserves owning rhinos to extend their guardianship as much as possible, as it extends their number of guardians, and puts more "eyes and ears" in their reserve.

Furthermore, technology, as well as improved training regimes, and extending the number of guardians, may be able to enhance guardian capabilities tremendously, and therefore, lead to a decrease of opportunities for crimes to be committed. Firstly, improved and perceptible guardian capabilities and capacities will influence the offender's decision-making process, and may deter an offender from acting on his criminal inclinations and motivations. This factor is very important to offender decision-making and will be discussed in the next part of the triangulation of the theoretical framework in this study. Secondly, technological capabilities, in addition to improved training and education, may eventually ease the workload of the existent guardians, as well as enable them to intercept an offender before he is able to successfully complete the crime.

In order to explain the temporal dependencies within their Routine Activity Theory, Cohen and Felson (1979) employed selected concepts of Hawley's "Human Ecological Theory" (Hawley, 1950, as cited in Cohen & Felson, 1979, p. 589). Using three identified components of community structure, Cohen and Felson (1979) explain how these components influence the occurrence of crime (p.590). The three components they chose are (1) rhythm, as "the regular periodicity with which events occur" (Cohen & Felson, 1979, p. 590), (2) tempo, as "the number of events per unit of time" (Cohen & Felson, 1979, p. 590), and (3) timing as "the coordination among different activities" (Cohen & Felson, 1979, p. 590) within a community. Cohen and Felson (1979) emphasize, the sociologist "Amos Hawley treats the community not simply as a unit of territory, but rather as an organization of symbiotic and commensalistic relationships as human activities are performed over both space and time" (p.589).

In order to better understand the macro sphere of rhino poaching in private nature reserves as communities in Hawley's sense, the components of rhythm, tempo and timing of

routine activities warrant a closer look. In a nature reserve such periodicity, tempo and timing can be observed in the regularity and amount of game drives, anti-poaching units' patrols, as well as animal migration to waterholes. These regularly occurring activities, when perceptible by a possible offender with both criminal inclination and the ability to carry out the crime, may lead the offender to include these facts into his planning and to adjust his own timing accordingly in order to heighten his chances of success.

However, there is an element of control embedded in these regularly occurring activities for the guardianship of a reserve. Anti-poaching patrols can be randomized both concerning times and routes. Animal migration to sources of water and animal visibility may be made less perceptible by increasing the amount of artificial waterholes in less visible areas. Using different routes within the reserve can randomize game drives and lessen offenders' chances of evading these.

3.4 Rational Choice Theory

Rational Choice Theory (Cornish & Clarke, 1985) is a complementary criminological theory to Cohen and Felson's Routine Activity Theory (Cohen & Felson, 1979). It emerged from the field of economics and then found its way into other fields of research, i.e. psychology and sociology (Cornish & Clarke, 1985, p. 147). The rational choice theory in criminology, and the situational crime prevention approach based on it, assumes that offenders are reasoning, consciously thinking individuals who perform a weighing process between the "choice-structuring properties" (Cornish & Clarke, 1987, p. 935) of effort, risk and reward of a crime, resulting in rational choices and decisions (Cornish & Clarke, 2003, p. 60). Crime, in this regard, is the outcome of a potential offender striving to attain a certain goal and the conclusion that illegal means are the most suitable route of action. The realization that legal means to attain this goal are not available, or the offender would have to display highly increased effort and possibly receive decreased rewards, are factors aiding the readying process within the offender, as they tilt the cost-benefit equation to his disadvantage.

Simplifying this cost-benefit equation of the potential offender from his perspective, the balance of perceived risk, anticipated effort and potential reward of a crime has to be favorable for him. When the perceived risk and the anticipated effort needed to commit the crime are low, and the potential reward is high, the cost-benefit analysis results in a favorable outcome for the decision to commit the crime the potential offender is contemplating. Once this decision-process

is completed, the offender is readied for a crime and starts actively seeking opportunities. Hence, following Cornish & Clarke's (2003) argumentation, an offender, in their theory, is a choosing, proactive individual, rather than a precipitated one (Cornish & Clarke, 2003, p. 86).

These assumptions resulted in the realization that, while motivations in offenders may be hard to assess and change, situational prevention focusing on opportunity reduction by altering the "choice-structuring properties" (Cornish & Clarke, 1987, p. 935) of the equation of risk, effort, and reward may be beneficial in order to prevent crime from happening by making the choice for crime an undesirable one. Cornish and Clarke's (1985) research resulted in the design of traditional situational prevention techniques deemed applicable to a variety of predatory, direct-contact offenses. Over the last two decades, these traditional situational prevention methods have been applied to a variety of common crime problems, i.e. child sexual abuse (Wortley & Smallbone, 2006) and theft (Matsueda, Kreager, & Huizinga, 2006) and have been utilized to design crime prevention policies, i.e. in Australia (Morgan, Boxall, Lindeman, & Anderson, 2011).

More recently, these same theories and methods have also been applied to wildlife crime, and poaching in particular (Clarke & De By, 2013; Pires & Clarke, 2012; Pires & Moreto, 2011). In relation to the crime of rhino poaching, these three "choice-structuring properties" (Cornish & Clarke, 1987, p. 935) of the cost-benefit analysis performed by potential offenders will in further be examined individually.

3.4.1 Anticipated Effort

The decision-making process described above happens in what Cornish & Clarke (2003) call the readying phase (p 50). Realistically, in this phase, an offender is mostly limited to "guesstimates" due to the fact that he has not yet performed the illegal act, but is considering it and weighing his options. Due to this fact, and the point in time this process takes place, the term anticipated effort seems more fitting. The potential offender has come to the conclusion that legal acts will either not help him to attain his goal, or demand too much effort and do not yield enough reward. Hence, his perception is that crime in order to attain a goal is a generally favorable option.

When weighing the favorability of crime, the potential anticipates a certain amount of effort will be needed in order to perform the crime in question. The anticipated effort for a potential offender can be regarded as the energy he has to invest in order to attain his target. This

amount of anticipated effort has to be proportionate to the expected reward. If the anticipated effort to attain his goal is perceived as too high, the potential offender will most likely refrain from the criminal act entirely. If this is not the case, the potential offender may be forced to adjust his goal and his cost-benefit analysis, and possibly incur a decrease in reward, due to decreasing his efforts.

The anticipated effort, when relating this factor to the crime of rhino poaching, can be found in the time needed to plan, prepare, and perform the crime. It may entail the time and money needed for preparation in order to gain access to a weapon, a vehicle and other equipment the offender will need, the time needed to locate a rhino, as well as the actual time the offender will have to spend on foot in a reserve and endure hardships before and after the crime.

Anticipated effort also entails the energy and equipment needed to gain access to a reserve and exit it with the rhino horn by legal or illegal means. Furthermore, the time and energy a potential offender has to invest in order to gather the intelligence, information, and skills needed to perform the chosen crime can be considered as anticipated effort, as well. These skills could be learning to shoot a weapon, learning to track an animal, learning survival under harsh conditions in dangerous environments, and decoying techniques in the bush in order to be less visible for possible guardians.

3.4.2 Perceived Risk

The second element of the "choice-structuring properties" (Cornish & Clarke, 1987, p. 935) within a potential offender's cost-benefit analysis is the perceived risk of the crime in question. Emphasizing once over the point in time this analysis takes place, the terminology of perceived risk seems more targeted. This choice of terminology also emphasizes that there may be a substantial amount of divergence between the perceived amount of risk and the reality of risk for a particular target, as well as the dependency on the potential offenders abilities and performance of reconnaissance.

A potential offender has to perform reconnaissance and adjust his perception of the perceived risks accordingly. When the risk of a crime is perceived as too high, the potential offender may either be deterred from committing this crime entirely, switch his efforts to a crime entailing less risk and possibly lower rewards, or simply divert his attention to a softer target, i.e. an area less guarded. However, the factor of perceived risk entails intrinsic and extrinsic factors, relating directly to a target in question.

Intrinsic factors can be the amount of visible guardianship, visible barriers, as well as visible technology in place, which all heighten the perception of risk for the offender. Extrinsic factors relate to the possible repercussions of the crime in question if the offender gets caught, as well as the status of the crime itself. The repercussions of the crime in this regard pertain to the factors of certainty, severity, as well as the celerity of punishment. When certainty of punishment is low, the severity of punishment is low, and the celerity of punishment is protracted, the perceived risk in regard to extrinsic factors remains low for the potential offender as well.

The status of the crime in question pertains to the legal classification of an act as misdemeanor or felony offense, as well as the immorality as it is perceived by society. When an offense is not morally condemned by society, i.e. jaywalking, it is perceived as permissible or negligible. Permissibility in turn can signal a potential offender a low perceived risk for the crime in question, as he will not have to fear condemnation by society, nor punishment by the law.

For the crime of rhino poaching, as well as environmental crimes in general, the perceived risk in regard to certainty, severity, and celerity of punishment is relatively low (Faure, 2009). Whereas the deterrent factors Faure (2009) outlined in his paper may apply for corporate actors in the environmental crime arena, these factors unfortunately do not seem to possess any deterrence ability when it comes to individual actors in the wildlife crime arena. They will neither fear public shaming, nor are they concerned about the possibility of having to stand trial in court. In fact, the most widely publicized and famed case of rhino poaching trials against the Dawie Groenewald gang is still pending, as has been since the arrest in September 2010 (Financial Transparency Coalition, 2013).

Rademeyer (2012) pointed out that only in recent years have offenders occasionally been punished with substantial time in jail and until this day, offenders often only received the proverbial slap on the wrist (Rademeyer, 2012). If cases go to court at all, it usually takes a substantial amount of time until eventually any sort of outcome or punishment is determined. Coert Jordaan, a lawyer for SANParks, pointed out that only approximately 20% of all poaching dockets result in cases being dealt with in court (C. Jordaan, personal communication, January 31, 2014). The rest never reaches this point. He further enlightened that this is often due to investigations not being properly dealt with, faulty paperwork, a lack of continuous custody of

evidence, and a generally over-fraught court system (C. Jordaan, personal communication, January 31, 2014).

Hence, a potential offender calculating the perceived risk of rhino poaching will come to the conclusion that the perceived risk in regard to certainty, severity, and celerity of punishment is low. Furthermore, it is this exact lack of punishment, which creates a certain status of permissibility for the offense. Moreover, (armed) criminal trespassing to commit a crime is legally classified as a Schedule 1 offense in South Africa's Criminal Procedure Act 51 of 1977 (The Government of South Africa, 1977), which entails that release on bail pre-trial is possible. Instead, it should be classified as a Schedule 5 offense, for which posting bail is far more difficult. This Schedule 1 offense classification further heightens the perception of rhino poaching not being considered a serious enough crime by legislators, and hence, it appears permissible.

While the outrage against rhino poaching in South African society is certainly present, it is demographically located within the white sections of the population (A. Thomson, personal communication, February 5, 2014). In addition, all other forms of crime are rampant in South Africa, and law enforcement is perceived as rather ineffective and corrupt (A. Thomson, personal communication, February 5, 2014). Due to the fact that rhino poaching is an environmental crime there is the notion in certain parts of South African society that "it is just an animal" (A. Thomson, personal communication, February 5, 2014; K. Brebner, personal communication, February 6th, 2014). Therefore, the perception of immorality of rhino poaching in society is at the present time not high enough to be a substantial factor of deterrence to increase the perceived risk for the potential offender.

The intrinsic factors of perceived risk of rhino poaching relate directly to a targeted reserve in question. These factors are directly dependent on a variety of informational elements the offender has to gather and include in his weighing process. The perception of risk for the offender will change dramatically between a target with no visible guardianship and one where there is extensive visible manpower on the ground. Factors further included in this assessment could possibly be whether or not the reserve uses technology to guard its premises, whether it is visibly secured with a barrier, i.e. a fence or wall, whether or not it is home to potentially dangerous animals, i.e. big 5 game, and the size of the reserve in question.

3.4.3 Expected Reward

The third and last element in the cost-benefit analysis of a potential offender is the "choice-structuring property" (Cornish & Clarke, 1987, p. 935) of reward. Here again, due to the point in time this cost-benefit analysis takes place, the terminology of choice is altered to expected reward. In fact, there may be a substantial divergence between what the offender expects and what he eventually receives. However, it is the expectation of the reward, which influences first-time offenders most, due to the fact that they cannot draw on any previous experience in this regard. Repeat offenders, on the other hand, certainly have experiences to draw on and may seek ways to maximize their actual rewards of the crime prior to its commission, i.e. by looking for various markets to sell goods of theft.

Furthermore, the "choice-structuring property" (Cornish & Clarke, 1987, p. 935) of expected reward is directly related to an offender's desired goal. While sexual offenders may receive their reward and goal in the immediate release of sexual tension, thieves can achieve their goal of wealth through the sale of theft property. In both cases, they improve their personal, immediate sustenance position, although in different ways. Sexual offenders do not gain a monetary reward but improve their psychological sustenance position by finding a release for criminal tendencies whereas thieves improve their physical sustenance position by gaining monetary benefit from the commission of crime.

In regard to the crime of rhino poaching it is remarkable that the perceived reward entirely lies in monies anticipated by possible offenders and the goal to improve their physical sustenance position through the acquisition of monetary benefits otherwise impossible to achieve. The sale of rhino horn currently generates approximately 65,000USD per kilogram of horn. Furthermore, it is unquestionable that the low-level poacher's share represents amounts of money he could never generate by the use of legal means. Vince Barkas shared during his interview that the low-level poaching groups ProTrack often arrests earn up to 90,000 ZAR (approximately 6,000 €) per kilogram of rhino horn (V. Barkas, personal communication, January 23, 2014). With the average horn around 4 kilograms in total this equates to earnings of up to 360,000 ZAR (approximately 24,000 €) for a group of 4 or 5 poachers. Thus, each poacher in the group earns between 4,800 € and 6,000 € per horn poached, which is more than 4 times the average annual income of a domestic worker in South Africa.

Also, it is suspected that a potential offender will have a market to sell his product in before the actual commission of the crime. Whether the poacher is approached by a middleman or actively seeks the middleman out himself is in the end irrelevant. However, what may become relevant to the factor of anticipated reward is the availability of the desired good. In regard to rhino horn, the species are on the brink of extinction, which in turn may make the product all the more valuable due to scarcity. The leftover specimen are likely to achieve a higher price in turn which then may encourage possible offenders via the increased expected rewards.

3.4 Situational Crime Prevention

Situational Crime Prevention theory (SCPT) resulted from the research and application of both the Routine Activity Theory (Cohen & Felson, 1979) and Rational Choice Theory (Cornish & Clarke, 1986) to various problems of crime and the aim of finding measures to counter them. These theories emphasize the importance of the immediate environment and available opportunities in offender decision-making, as well as the realization that in fact human shape their environment and surroundings.

As Cornish (1994) elaborates, the attractiveness of the Situational Crime Prevention measures "lies in their apparent simplicity and practicality" (Cornish, 1994, p. 153). Furthermore, he emphasizes that "[o]ffenders do not have to be identified before they can be dealt with" (Cornish, 1994, p. 153), while the "[c]orrect identification of the goals of criminal activity is […] required" (Cornish, 1994, p. 153).

Most recently, Huisman and van Erp (2013) applied SCPT to environmental, white-collar crime. Their main criticism was that SCPT was designed to combat crimes of commission, yet they found the environmental crimes they studied to be mostly crimes of omission (Huisman & Van Erp, 2013). They concluded that although SCPT may not be the ideal framework in order to prevent these particular environmental crimes, albeit SCPT was useful in identifying opportunity structures (Huisman & Van Erp, 2013, p. 1195). Therefore, when applied to crimes of commission, especially wildlife crimes, SCPT can aid in the creation of successful prevention strategies.

An immediate necessity for Situational Crime Prevention approaches is that they have to be crime specific (Cornish & Clarke, 1987) and familiar with the how, when and where of the crime in question (Cornish, 1994, p. 153). Furthermore, they "involve the management, design or manipulation of the immediate environment in as systematic and permanent way as possible"

(Clarke, 1997, p. 4). By identifying and defining the crime in question, as well as the enabling environmental structures and conditions, situational crime prevention aims to find ways to reduce the prevalent opportunities for this particular crime.

The general assumption is that, despite unidentified offenders, reducing opportunities will lead to a decrease in crime. This end is to be achieved by exploiting and altering the factors of perceived risk, anticipated effort, and potential reward within the offender's cost-benefit analysis through a variety of methods. Clarke (1997) elaborates that being crime-specific not only means to generally distinguish between certain types of crime and their distinct differences (Clarke, 1997, p. 4). It also means to distinguish between the ranges within one type of crime, as the different ranges may necessitate an entirely different arsenal of counter-measures (Clarke, 1997, p. 4).

In relation to the study at hand, it is of vital importance to keep in mind that the subject under consideration is the crime of poaching of rhino horn, and not other forms of poaching, such as sustenance poaching. While some of the measures suitable to address rhino poaching may also be promising to counter other forms of poaching, others may not. Hence, the need for narrow approaches within the ranges of a type of crime in order to successfully counter it.

Increasing Perceived Effort	**Increasing Perceived Risks**	**Reducing Anticipated Rewards**	**Removing Excuses**
1. Target Hardening	5. Entry/Exit screening	9. Target Removal	13. Rule setting
2. Access Control	6. Formal Surveillance	10. Identifying property	14. Stimulating conscience
3. Deflecting Offenders	7. Surveillance by employees	11. Reducing temptation	15. Controlling dis-inhibitors
4. Controlling Facilitators	8. Natural Surveillance	12. Denying benefits	16. Facilitating compliance

Figure 3 - Reduced Table of opportunity-reducing techniques (Clarke, 1997, p18)

Clarke's research resulted in four categories of situational crime prevention techniques, which have since been modified and updated (Clarke, 1997, Preface VIII) to: (1) increasing perceived effort, (2) increasing perceived risk, (3) reducing anticipated reward, and (4) removing

excuses (Clarke, 1997, p. 18). Under these four categories, Clarke subsumed 16 situational prevention techniques, displayed above in figure 3. These techniques have since been amended and expanded to five categories and 25 techniques (Center for Problem-Oriented Policing, 2014), however, the choice for the table in use was based on the fact that it seemed to be more applicable for the crime of rhino poaching and the management obligations and capabilities of stakeholders in a private nature reserve. The fifth category of "reduce provocations" (Center for Problem-Oriented Policing, 2014, table 1) was therefore not included in this assessment.

It is important to note that situational prevention, as Clarke (1997) elaborates "is not one hundred percent effective" (Clarke, 1997, p. 26). It is rather the case, that situational prevention will "ameliorate, not eliminate a problem" (Clarke, 1997, p. 26). He also found that offenders might evade or circumvent situational prevention techniques (Clarke, 1997). If this is the case, the techniques in use may need to be adapted to the situation again, i.e. if improved fencing is evaded or circumvented, the new ports of entry will have to be identified and closed.

3.5 Summary

Cohen and Felson's (1979) Routine Activity Theory aids in explaining the crime of rhino poaching by using the tempo-spatial convergence of the three basic factors. It thereby highlights the fact that there is an intrinsic element of control embedded into this theory. In acknowledgment that offender motivation may be hard to assess and even harder to permanently influence, the two factors of target suitability and the absence of capable guardians were identified as the more malleable ones in this equation. This is not to mean rhino poaching as a crime can be designed out of its environment entirely, but rather that by controlling and improving the two malleable factors the numbers of perceived opportunities for this crime could be reduced.

Cornish and Clarke's (1986) Rational Choice Theory explains the "choice-structuring properties" (Cornish & Clarke, 1987, p. 935) of crime, and was in turn found suitable in order to explain the decision-making processes a potential offender engages in for the crime of rhino poaching. Furthermore, Rational Choice Theory (Cornish & Clarke, 1986) highlights the fact that an offender does indeed engage in a cost-benefit analysis a priori to the commission of a crime. The examination of the "choice-structuring properties" (Cornish & Clarke, 1987, p. 935) of anticipated effort, perceived risk, and expected reward led to the conclusion that by altering this cost-benefit equation, offenders may be dissuaded from the commission of a crime at a

particular location through the employment of situational crime prevention techniques, which mitigate and ameliorate situational vulnerabilities. While situational crime prevention techniques and strategies are not foolproof and a fix-it-all measure, they have been found to be applicable in the context of rhino poaching.

In what follows, a basic risk assessment will discuss the most obvious vulnerabilities of the site of research. The Balule Rhino Conservation Model's organization and the management of the comprehensive multi-stakeholder framework will be explored, using the results of stakeholder interviews. The study will continue with relating each of the measures in place at Balule Nature Reserve to counter rhino poaching to Clarke's (1997) situational crime prevention techniques. The measures employed at the site of research for this study will be classified within the table of situational crime prevention measures, also outlining possible future measures, as well as funding ideas for these.

4. Organization and Management of the Balule Rhino Conservation Model

4.1 Background

The Balule Rhino Conservation Model is comprised of three organizational levels of management and response to identified poaching threats. It has been designed after the anticipated shift of poaching incidents from Kruger National Park in the east to its western boundaries. The increased pressure on rhino poachers within the National Park was expected to result in the displacement of incidents to areas, which are easier to target. Therefore, in 2011, Balule Nature Reserve, and the stakeholders connected to the reserve anticipated an increase in rhino poaching numbers coming towards their area. This led to the identification of a need for preventative and risk-based response mechanisms to counter these threats.

In addition, what sparked the creation of the Balule Rhino Conservation Model was the fact that in 2011 Balule Nature Reserve became part of the Black Rhino Range Expansion Project (BRREP) of the World Wildlife Fund (WWF). The project aims to increase Black Rhino population numbers by creating new populations where there formerly had been none (World Wildlife Fund, n.d.).

The contract between BRREP, WWF and Balule Nature Reserve resulted in the translocation of a population of Black Rhinoceroses to Balule Nature Reserve. The realization quickly followed that these animals will need protection from poaching threats. Hence, the involved stakeholders created the Balule Rhino Conservation Model at the beginning of the year 2012, which has been implemented step-by-step and has been fully operational since September 2013 in the Olifants West region of the reserve.

The Balule Rhino Conservation Model represents a unique model and approach in the realm of government-private partnership in South Africa, involving governmental stakeholders in addition to domestic and international non-governmental organizations, non-profit organizations and private security stakeholders. Furthermore, in addition to threat response measures and governance of anti-poaching efforts, the Balule Rhino Conservation Model entails a social responsibility element and seeks to alter the existing socio-economic disparities within the local communities.

It is generally accepted that the situation in South Africa nowadays, despite being one of the few fairly prosperous African nations, is such that the divide between the black and white populations living there has hardly changed at all since South Africa became a democratic

country (Conway-Smith, 2014). Whereas the white populations enjoy the majority of wealth and comfort, most of the black populations live in poverty. Access to meat for their daily diet is not self-evident, and food prices for meat are too high for most to buy meat on a regular basis. The average monthly salary for a domestic worker (i.e. gardener) lies between 1491.86 ZAR and 1746 ZAR, depending on location (Wagendicator.org, 2014, para. 3,4). With the current exchange rate this amount of money translates to between 98,17€ and 114,89€, which is hardly enough to feed oneself.

Furthermore, as Vincent Barkas of ProTrack explained, the cultural divides are still present as well. “Black and White people in South Africa don’t even know how to shake hands, but they are expected to live together” (Bracken & Barkas, 2013, Time 1:28). Whereas a white person is taught a firm grip, a black person would perceive that as aggressive behavior. A black and white person actually working together side by side on an equal level within a hierarchy is still very much the exception, rather than the rule.

In addition to the need to swiftly counter poaching threats, the idea behind the governance model of the Balule Rhino Conservation Model is the identified need for social change and community involvement. The base assumption is, that in order to effectively protect wildlife in the long run, the local communities need to experience the benefit of wildlife and its presence. By creating a vested interest in the survival of wildlife in general and the rhino in particular, it becomes possible to include local communities into these conservation and crime prevention governance models. This not only creates local ownership and job opportunities for formerly disadvantaged communities, it also represents a push for a major change in the fabric of society, and may unite all layers of society behind a common goal.

Since colonial times, wildlife and nature reserves, as well as hunting concessions, have been regarded as “the white man’s playground and toys” (V. Barkas, personal communication, January 23, 2014). Usually, the average person from an indigenous community never has been able to enjoy wildlife, and much less benefitted from its existence, other than using wildlife as a source of meat. The environmental monitors employed in the Black Mamba APU also supported this claim during their interviews. Most of them have never had the opportunity to view, photograph, or experience wildlife prior to working for the Balule Rhino Conservation Model.

In order to spark the desired and much needed social change and community spirit, the Balule Rhino Conservation Model, in collaboration with the Kruger2Canyon Biosphere,

SANParks, and the National Department of Environmental Affairs ("K2C Environmental Monitors," 2013) does not only recruit their Environmental Monitors from local disadvantaged populations, but furthermore networks with a variety of local initiatives, i.e. Green Kidz (Brassett, 2014). These initiatives create opportunities for local children to be directly involved with wildlife and conservation activities for the first time in their lives. It is an attempt at sparking an interest in nature conservation at the earliest age possible by teaching local schoolchildren why there is a need for conservation.

The Balule Rhino Conservation Model dispatches their Environmental Monitors to local schools and villages as “Wildlife Ambassadors”, and thereby creates learning opportunities that did not exist before. Additionally, Balule Nature Reserve, in collaboration with lodges and tourism provider on the reserve, also invites local schoolchildren on game drives, bush walks, wildlife activities, and even a rhino collaring, within the reserve and provides them with “once-in-a-lifetime” experiences.

4.2 Poaching Risk Assessment for Balule Nature Reserve

Balule Game Reserve is located on the western edge of the Greater Kruger Park area, located directly next to Route 40 between Hoedspruit and Phalaborwa. Its western boundary is a continuous fence line of approximately 25kilometers, directly next to Route 40, and intersected by gates leading into different sections of the Nature Reserve. Route 40 is a major tar road with frequent motor vehicle traffic in both directions, including heavy truck traffic leading to the two local mines in Mica and Phalaborwa. It is also where a poacher may be able to spot game, including rhinos, from outside the reserve, or finds weaknesses in the fence line to exploit for access. Furthermore, incursion detection on the fence is very much a gamble, as it is rather designed to keep animals in, than to keep humans out. To the east, the Nature Reserve is completely unfenced, and game migrates in and out of the area according to their needs.

Hoedspruit, the town located the closest to Balule Nature Reserve, is a settlement of approximately 3500 people and located within the Maruleng municipality. The current unemployment rate in the municipality is 39,9% (YES! Media, 2012, para. 3). In the age group of 20 years and older a 20,9% ratio persists of people who have not received any schooling (YES! Media, 2012, para. 3). However, the unemployment rate for the town of Hoedspruit is suspected to be higher than the average in the municipality. Another fact not to be underestimated is that a small amount of indigenous people lives on Balule Nature Reserve land.

Some of them work at the lodges to sustain themselves; others work for private landowners within the reserve. Concerning the general threat of poaching to this reserve, the tradition of bush meat harvesting is based within local tradition and tribal culture, as much as it is born out of a need for sustenance (C. Spencer, personal communication, January 21, 2014; V. Barkas, personal communication, January 23, 2014).

Unemployment and persisting poverty can be counted among the most prevalent reasons for these facts. However, the land Balule Nature Reserve is situated on is not, and never has been, considered tribal land and is not contested as such. It has previously been used as cattle ranching properties. In 2006, cattle farming ended and the land was used as hunting concessions and game reserves, hosting hunters and tourism providers. It was finally transformed into nature reserve status in 2013. White South Africans and foreign landowners exclusively own it.

In the past, Some of the indigenous people employed on the reserve have partaken in sustenance poaching through indiscriminate snaring and caging, and this fact continues to represent a threat to all wildlife due its indiscriminate nature. The sustenance poacher never knows, nor does he usually care, what he catches with the snares he sets (C. Spencer, personal communication, January 21, 2014).

However, what exacerbates the threat for rhino populations is that local farms outside the reserve have been targeted in robberies, and firearms were taken in the process. These firearms then tend to reappear in poaching incidents, as the poachers usually use hunting rifles instead of small arms calibers (C. Spencer, personal communication, January 21, 2014). In general, weapons are stored at every game lodge and farm. The control of weapons is rather lenient, and access is possible for every game ranger (C. Spencer, personal communication, January 21, 2014). Furthermore, even guests can bring weapons to the reserve, as long as they comply with South African legislation and have a valid permit.

Completing the risk assessment is the fact that the Olifants River and a railroad line intersect Balule Nature Reserve, and both represent major weaknesses in the reserve's defense. The river and the railroad line have in the past been used as points of entry by poachers and are very hard to control (R. Ahlers, personal communication, January 22, 2014). In addition, both of these ports of entry make tracking of suspected poachers nearly impossible, as they are able to easily mask their movements and spoor both in the river and on railroad tracks. Trains move across the reserve 6 times a day going to and from the mines located north of the reserve (C.

Spencer, personal communication, January 21, 2014). The trains transport cargo only; however, at certain points en route, they have been observed to be slow enough for a person to be able to jump on easily and traverse across the reserve on them.

4.3 Organization

The governance within the Balule Rhino Conservation Model is organized as a pyramid. Located at the base of the pyramid, the Environmental Monitors play an integral role as visible patrols and "boots on the ground" within the reserve (figure 4). It has been agreed among all sections of Balule Nature Reserve to eventually increase the number of environmental monitors to one per 1000 ha, however, currently the only section using Environmental Monitors is the Olifants West Region.

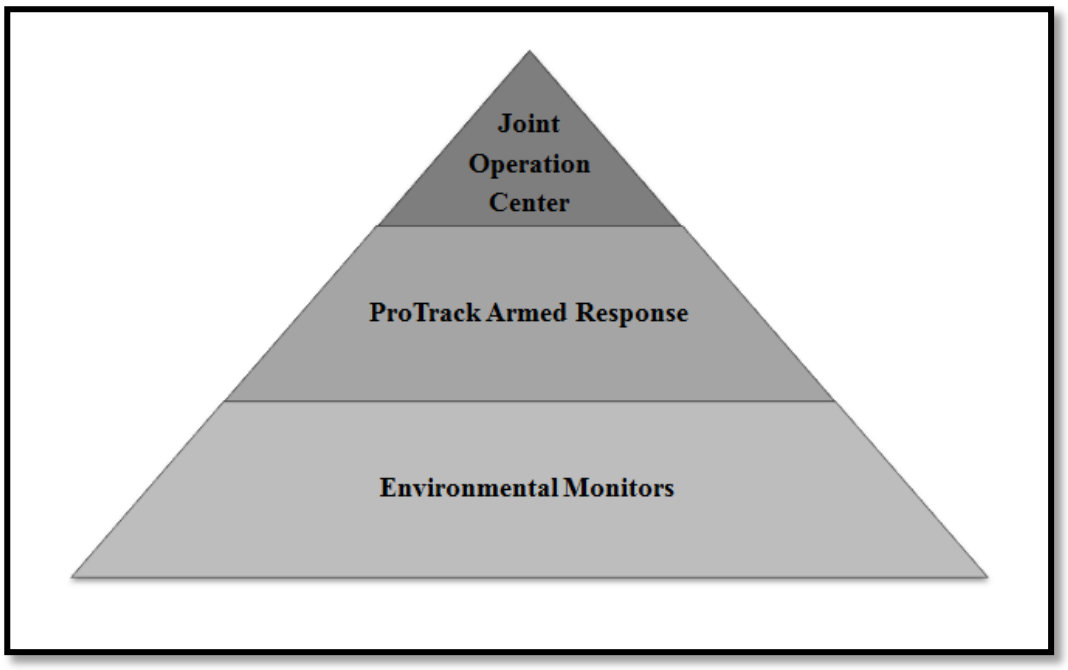

Figure 4 - Pyramidal display of the Balule Rhino Conservation Model and its components (© E. Reuter, 2014)

The second rung on the pyramid consists of the Pro Track Armed Response Teams (figure 4). These teams respond to detections from the Environmental Monitors, as well as to any other intelligence gathered concerning poaching and incursion threats. Furthermore, they are permanently located within the reserve on a rotational basis. This offers the advantage to seriously reduce incident response time for detected threats within the reserve, despite the fact that the area to observe consists of 50,000 hectares of bush. The top of the pyramid is

represented by the Joint Operation Center (figure 4), which serves the entire Balule Nature Reserve.

4.3.1 Joint Operation Center

A two-person team coordinates all of the operations within Balule Nature Reserve, as well as collaborates with neighboring reserves' anti-poaching coalitions. The personnel of the Joint Operation Center are also in charge of the collection, evaluation, and dissemination of outside intelligence concerning poaching threats to the reserve. Furthermore, the Joint Operation Center also manages the intelligence network of informants and independently investigates reported poaching threats outside of the reserve's borders. The Joint Operation Center and the Balule Rhino Conservation Model function as what Hilary Clinton proposed in 2012: a regional center of expertise to counter poaching threats (Rhino Mercy, 2013).

One of the main challenges outlined by all Joint Operation Center personnel concerns the response time to incidents, as currently there is no air support or air surveillance to better coordinate ground troops within the reserve and direct them more accurately toward a suspected poachers position. The reason for the lack of air surveillance is currently due to the fact that finances are limited and air support is a very costly measure. The Joint Operation Center has invited several entrepreneurs in the drone business and organized several demonstrations but until there is a strategy decided upon how to finance this measure it will not be able to be added to the set of measures to counter poaching at Balule Nature Reserve.

4.3.2 Pro Track Armed Response Team

Vincent Barkas founded the Pro Track Anti-Poaching Unit in 1992. It was the first private Anti-Poaching Unit in South Africa, and has since then become the largest privately run provider of Anti-Poaching and Security Services (Pro Track, 2011). Pro Track is a fundamental part of Balule Nature Reserve's overall anti-poaching strategy, which provides armed response for the Balule area, responding to detections made by the environmental monitors, as well as all other intelligence gathered.

The Joint Operation Center coordinates and dispatches the regular patrols of these armed guards within the reserve. The Pro Track personnel work on a rotational basis on the reserve, during which they live in very basic, clandestine accommodations throughout the reserve, usually with only solar power and borehole water. While these conditions may not be for

everyone, Pro Track attracts a large number of applicants to their training courses (V. Barkas, personal communication, January 23, 2014).

On average, Pro Track trains 90 applicants per year in their courses. Very much in accordance with the overall idea of social responsibility and change, Pro Track hires with no regard to ethnicity or color of skin, meaning both black and white applicants are hired and perform the same courses and trainings together. This is certainly a change from the norm and teaches both blacks and whites to work together toward a common goal as equal team members. Furthermore, Pro Track founder Vincent Barkas elaborated that these courses constitute a means of gaining qualification, especially for the black populations, and represent a measure of upward development they are normally not afforded. “After having acquired their certifications and trainings with Pro Track, these guys can literally apply anywhere in the security arena and are sure to be hired and given the opportunity to further qualify” (V. Barkas, personal communication, January 23, 2014).

Moreover, Pro Track does not propagate a “shoot to kill” policy in the reserves it protects. While often, especially in Kruger National Park, the success rate of operations is measured in poachers shot, V. Barkas strongly believes that a “shoot to kill” policy does not serve the overall goal. Quite contrary, a “shoot to kill” policy results in more harm than good. “Every time you shoot a poacher, you take away a provider from a community and, therefore, antagonize the rest of that very same community, due to shooting one of their own (V. Barkas, personal communication, January 23, 2014). A shoot to kill approach, while popular with frustrated factions of the public, as well as the conservation and law enforcement arena, is not the intended course of action for Pro Track and their employees.

Firstly, the number of poachers shot cannot be a measure of indication for success. This is due to the fact that for every poacher shot there are literally ten in line to fill in for casualties (V. Barkas, personal communication, January 23, 2014; C. Spencer, personal communication, January 21, 2014). There is no shortage of people willing to poach, which in turn is based in the monetary rewards possible in this endeavor. Secondly, it is not to be considered a success to kill poachers, as this measure makes null and void all opportunities for intelligence gathering at the source in order to identify, locate, and arrest the middlemen within poaching syndicates.

Not only international illegal wildlife trade syndicates have become more organized and sophisticated over the last years, the same applies for the poachers on the ground. Poaching

syndicates are built on the same structures and function through division of labor among the members (C. Spencer, personal communication, January 21, 2014) In order to gather as much information as possible from them, it is preferable to arrest them and exploit whatever information is to be gleaned. However, what has to be kept in mind when acknowledging the increase in sophistication and organization of poachers on the ground is the fact that, due to the syndicated structures, the poachers arrested at a crime scene or during a follow-up pursuit may not know middlemen and other members.

Nevertheless, an arrest is always an opportunity of intelligence gathering, which should be exploited to its maximum potential. Legally, the employees of a private security provider are bound to South African law. They can only employ lethal force when their own life, or the life of another person is in immediate danger (The Government of South Africa, 1977, Article 49). Hence, to shoot everyone on sight who is suspected to be a poacher is to be considered illegal and will result in legal repercussions for private security employees.

In addition to the opportunities for qualification and skill set building mentioned above, Pro Track is engaged in a variety of community involvement projects, i.e. Green Kidz (Brassett, 2014). In further accordance with the identified overall need for community involvement and social change, Vincent Barkas of Pro Track highlighted a need for local ownership and branding of initiatives to fight rhino poaching.

Instead of involving mostly international donors and allowing them to brand their contributions with company names and logos, it would be beneficial to allow communities to leave their literal footprint. This would, for one, add credibility to international proclamations of selfless giving for the plight of the rhinos. A secondary benefit would be that local communities, which may not have the resources to contribute monetarily, could nevertheless be engaged and united towards the goal of fighting against illicit wildlife crime. “Simple public awareness campaigns can have huge benefits in spreading awareness when people’s basic needs are addressed in the process” explained Vincent Barkas from Pro Track (V. Barkas, personal communication, January 23, 2014).

4.3.3 Environmental Monitors

Initially, the Environmental Monitors had been an unemployment relief initiative under SANPark’s Biodiversity Social Projects and the South African Expanded Public Works Program by the National Department of Environmental Affairs ("K2C Environmental Monitors," 2013,

para. 2). The program was created with the intent to create jobs for disadvantaged parts of the population, while it was also hoped to yield the additional benefit of addressing poaching, as well as other environmental threats (South African Department of Environmental Affairs, 2014, para. 4). The program acknowledges the need for an increase in opportunities for employment, especially in disadvantaged communities, in order to relieve persisting poverty and inequality.

The initial plan proposed that 1000 Environmental Monitors be trained and paid under the auspice of SANParks (South African Department of Environmental Affairs, 2014, para. 4). What makes this part of the organizational pyramid and the Balule Rhino Conservation Model unique is that at Balule Nature Reserve the Environmental Monitors are included into an overall anti-poaching strategy and are comprised of mainly young women. The reasoning behind this decision was, that it is the women in a community who teach the children. By offering them employment in an industry they historically never had access to, and which is quite prestigious, the hope had been that their appreciation for wildlife and conservation would be passed down to their children.

While this is a long-term goal, it may be an integral part to changing perceptions in these factions of society towards a state of appreciation for wildlife by creating a vested interest. Additionally, the employment program represents an opportunity for education and raising awareness within local communities an outsider will have no access to and affords members of these formerly disadvantaged communities the opportunity to earn a sustainable income, to build a skill set through accredited training, and to qualify for expanded responsibilities in the future.

5. Situational Prevention measures in the Balule Rhino Conservation Model

The Balule Rhino Conservation Model employs proactive and reactive threat response measures, as well as measures to safeguard the integrity of the program and its employees. These measures will subsequently be considered individually and their significance in SCPT will be examined.

5.1 Proactive Measures at Balule Nature Reserve

5.1.1 VHF and GPS Collaring

At Balule Nature Reserve, both Very High Frequency (VHF) and Global Positioning System (GPS) collaring are used as conservation measures, as well as poaching prevention measures. Both technologies gather "green intelligence" (C. Spencer, personal communication, January 21, 2014) and are based on the premise that in order to protect your assets you have to know where they are. VHF collars are equipped with a transmitter, which sends out a signal to a receiver using a radio frequency unique to this particular transmitter. In order to locate the transmitter embedded into the collar, radio-telemetry is employed.

In contrast to this, GPS collars use satellite techniques, similar to a cell phones and transmit data at certain times specified by the researchers. These transmitters can be monitored remotely via Geographic Information System (GIS) mapping and do not require the person in charge to physically locate them in the field on a daily basis.

Furthermore, the GPS collars also transmit additional information, i.e. temperature of surroundings and the collar, location altitude, and time of the data gathered, and will send off an alert when an animal, or the collar, has been immobile for a longer period. A situation like this may mean two things: either the collar was lost and is laying somewhere in the bush; or the animal itself has been immobile due to sickness, having been poached, or having died of other causes.

An additional benefit of the GPS collars is, that it is possible to set up a "geo-fence" (S. J. Bosman, personal communication, February 23, 2014). When a geo-fence is established, i.e. for a poaching hotspot, the GPS collar immediately sends an alarm, when an animal crosses into this boundary. It is then up to the personnel monitoring the collars to decide what responses to this alarm are needed.

The data gathered from both of the collar types is collated and mapped on a daily basis. This "green intelligence" (C. Spencer, personal communication, January 21, 2014) is then

disseminated to the appropriate authorities, i.e. reserve management and anti-poaching patrol leaders.

For the Balule Rhino Conservation Model, it was decided that both the Black Rhino and the White Rhino population need monitoring. However, based on the animals' terrain preference, the decision was made to use GPS collars on White Rhinos exclusively, and VHF collars on the Black Rhinos exclusively. Furthermore, this choice was supported by trials of GPS collars on Black Rhinos, where the transmitters failed after a minimal working period of less than 89 days (S. J. Bosman, personal communication, February 23, 2014). This was found to be most likely due to the animals mainly traversing and inhabiting rocky, mountainous terrain. It is suspected that the constant scraping and beating against rocks may have broken the GPS collars.

The collaring is as much a poaching prevention technique, as it is a conservation effort. Both the VHF and GPS technology allow researchers to make educated assumptions concerning habitat use, range, and terrain preferences of the animals, as well as allow anti-poaching entities to locate their assets in the field and deploy their forces accordingly. The location techniques, and the disseminated data from them enable decision-makers to tailor patrols to areas of focus, as well as using overlay-mapping techniques by combining red and green intelligence to identify intersections of areas of weakness for intrusion and animal habitat. This results in the anticipation of possible hot spots, which may need more attention through patrols and intelligence gathering on the ground.

For any of the two varieties of collars to be deployed on an animal, it is necessary, however risky, to immobilize the animal. For a collaring procedure the animal will be immobilized for approximately 20minutes maximum. While immobilized, all other tests are performed, i.e. blood samples, skin scrapings for parasite checks, ear notches for identification, pregnancy test, and a general health and welfare assessment.

5.1.2 Camera Traps

Balule Nature Reserve uses camera traps at waterholes and servitude roads, as well as in other areas of concern throughout the reserve. Before placing a camera trap, there is a certain need for preparation, i.e. finding out whether there is signal coverage at a desired place for a camera trap. The camera traps in use are motion triggered and will transmit a photograph to the cellphones of up to three people. In this case, the recipient cell phones are the chief of the Joint

Operations Center, the assistant warden and the warden of the respective section. The recipients then determine what reaction is needed.

The use of camera traps is dually beneficial. They are used for conservation monitoring, i.e. waterhole usage, migration of certain species, preferred times of water intake of species, as well as a remote anti-poaching measure. The theory behind is that the poachers will go where the animals are located and waterholes migration is more or less frequent with most species and the camera traps will also take pictures of poachers should they come around a waterhole to locate a desired target. The transmission of the photograph from the camera trap is instant, provided the area is within cell phone coverage. Therefore, threat response can be set into gear as soon as possible and without the perpetrators knowledge. Nevertheless, response time is a critical issue due to the vastness of the territory.

5.1.2 Altering the Horn

In 2011, rhino horn treatment in the form of dye infusions, coupled with the injection of ectoparasiticides, became commercially available for game reserves and private rhino owners (Rhino Rescue Project, 2012, para. 9). The forerunner in this method to devalue rhino horn is, and has been, the Rhino Rescue Project (RRP) and Dr. Lorinda Hern. While most of the measures in place to fight poaching are reactive, the horn infusions are clearly proactive. They have become an integral part of anti-poaching methods in various nature reserves and smaller game farms, especially those with open boundaries towards Kruger National Park. Balule Nature Reserve has been one of the first to treat their population of rhinos using this method.

In order to be able to infuse a horn with the dye and medicine concoction, the rhino has to be darted and immobilized for approximately 45minutes. While this is always a risk, it is outweighed by the benefits. The time of immobilization also offers the chance to perform blood work, pregnancy tests, as well as a general health and welfare inspection. Furthermore, a DNA sample is taken from the rhino to be added to the national rhino database called RHODIS.

Lastly, a microchip is inserted into the horn in order to be able to track it, should it leave the reserve. The treatment is expected to last for one full growth cycle of the rhino's horn, being approximately three to four years. With completion of the growth cycle, the treatment has to be re-administered, since the rhino horn will have grown out and worn off, and will no longer show any signs of treatment. In addition to the treatment itself, the reserves which have treated their rhinos are obliged to post warning signs at their gates and fences in order to warn possible

intruders about the treatment and its adverse effects. This signage is usually posted in the languages Chinese, English, Tsonga and Zulu in order to assure that possible perpetrators understand its content.

Another benefit of the treatments is that they usually attract a lot of attention both on the reserve itself, as well as in surrounding areas and communities, which can be seen as an integral part of a visible policing scheme. Poachers do not know, which rhinos have been treated, and may refrain from entering a reserve where rhinos have been treated out of a negative cost-benefit-weighing process.

It takes poachers a substantial amount of time to track a rhino, traversing vast landscapes inhabited by predators and dangerous animals, and when finally locating a rhino hazarding the chance of finding a treated animal with a pink horn, which is difficult, if not impossible to sell afterwards. Therefore, a poacher would likely leave this reserve alone entirely, and aim to pursue a softer target, i.e. a reserve where the rhinos have not been treated.

One may argue, that the poachers could shoot a rhino, discover it has been treated, and move on to shoot another rhino within the same reserve. This line of argumentation means this method of horn devaluation does not curb the problem, but rather exacerbates it, and may lead to more rhinos being shot by poachers. In some places and instances, this may come to pass and play a role, however the method of dye infusions is not a standalone, fix-it-all measure. It has to be complemented by an overall anti-poaching strategy and response mechanisms throughout the reserve, as is the case in Balule Nature Reserve.

Hence, when a shot is fired within the reserve, the poachers have to fear that Anti-Poaching Units and Armed Response Teams are out looking for them so they will not have the time to track, find, and kill another rhino without increasing risk of detection and arrest. Therefore, the argument of exacerbation of the problem seems to be invalid in light of the complementary measures in place, although whether there is a noticeable displacement effect due to the employment of the measure of altering the rhino horn is currently not assessed. This may be a suitable line of research in the future.

The dye infusion process itself is not without critique though. The inventors of this process have been accused of trying to poison people, which is technically true. Nevertheless, the poison in use is not lethal. If consumed in large quantities, it can result in convulsions, nausea

and vomiting (Rhino Rescue Project - Proactive Poaching Prevention, 2012). Other critics allege the treatment not to work and the dye does not permanently stain the horn.

In her interview Dr. Lorinda Hern explained that the dyeing process for the rhino horn is very much like dyeing one's hair (L. Hern, personal communication, February 4, 2014). And just like hair, some horns may take better than others, and some may not take at all. It does, however, not warrant calling the method itself a failure, and it surely does not remove any of the additional benefits to the measure of horn infusions, i.e. visual policing, gathering DNA samples, microchip application, and health and welfare check-up for the animal.

Currently, scholars at the University of Pretoria are researching the method and ingredients to the horn infusions in order to perfect the process. In 2011, when the treatment offered commercially, time was of essence due to the rapid increase in poaching numbers. This fact was the justification for using the experimental treatment before proper research had been done on it. The fear was, that the results may not have mattered anymore, had the RRP waited for the research to be completed prior to using the method (Rhino Rescue Project, 2012, para. 9).

In the meantime, the Rhino Rescue Project is experimenting with other methods to devalue the horn. One of these methods is to inject a small quantity of radioactive isotopes into the rhino horn. The injected isotopes, i.e. Strontium-90, emit a mixture of beta and gamma rays from a capsule of about the size of a grain of rice (L. Hern, personal communication, February 4, 2014). The isotopes are radioactive and harmful when ingested by humans. However, the harm is not as immediate as with the ectoparasiticides currently in use. Research at the moment suggests, that the consumption may trigger cancer at a later point in time (Environmental Protection Agency, 2012). So far, tests on rhinos in a breeding facility under supervision of radiation specialists have shown it to be non-harmful to the treated animal itself, and the injected radioactive charge will not protrude or seep from the horn (L. Hern, personal communication, February 4, 2014).

The radioactive treatment is supposed to be used in addition to the current method of altering process of dyeing and medicating the horn. Furthermore, it will encompass the benefit of improved detectability when rhino horn is transported, due to the fact that airport scanners react to radioactivity and even diplomatic shipments are not exempt from such screening. An additional benefit can be seen in the fact that for a radioactive treatment alone, the animal would

only have to be immobilized for ten minutes instead of the 45 minutes a full dye infusion process takes.

When explaining this new method, Dr. Lorinda Hern emphasized the importance of communication and the power of rumors within the local culture (L. Hern, personal communication, February 4, 2014). She advocates publishing the clear message that the measures in use will be harmful to the poachers themselves in order to remove excuses for poaching. “Only when the local actors believe bad things will happen to them personally, we can hope to deter successfully from poaching” (L. Hern, personal communication, February 4, 2014).

5.1.3 Fence and Gate Operations

While Balule Nature Reserve is fenceless on the inside and towards the east, the western boundary consists of a fence line of approximately 25 kilometers length along the R40. The fence consists of wires and is electrified and it’s integrity, power supply, outages and power drops are to be logged in a fence logbook. It is however, rather designed to keep animals in than humans out. Furthermore, various gates leading into the different sections of the reserve intersect the fence.

Balule Nature Reserve allows self-drives of guests, regardless of whether they are inbound or outbound. When arriving at a gate, the gate guard either notifies the respective lodge via radio that there are guests to be picked up at the gate, or registers the guests’ details in the gate book and entry register. The lodges can send out a vehicle to pick guests up. The sign-in register and entry register accounts for everyone entering Balule Nature Reserve and provide an important accountability mechanism. However, the fact that the reserve allows self-drive for guests and contractors within the reserve possibly adds to a potential threat scenario, and opens up windows of opportunity for illegal activity while unsupervised on reserve grounds.

In order to maximize territorial integrity, the wardens also coordinate regular fence patrols both day and night, as well as regular gate checks and random checks of vehicles on the reserve on an ad hoc basis. While any vehicle leaving the reserve is subject to random checks and searches, in the coordinated gate operations all vehicles leaving the reserve are checked. This includes guests, as well as outbound contractors, lodge personnel, and landowners alike.

Some may perceive this measure as a major nuisance, but it is however a building block to hinder wildlife products and other contraband from leaving the reserve undetected. These measures have already led to the detection of various cases of theft from lodges and landowners.

5.1.4 Database of Personnel on the Nature Reserve

After the observation that local populations, i.e. staff on the reserve, engaged in snare setting and opportunistic subsistence poaching, the Balule Rhino Conservation Model decided to create a database of employees connected to the reserve. The data collected includes their name, date of birth, home address, vehicle details, modes of transport, job details, as well as a picture. The database was subsequently used to create identification cards for each reserve employee as a measure of legitimization at the gates when entering and exiting the reserve. This measure led to a dual advantage: it allowed the assessment of how many people are employed on reserve grounds and where their home communities are, and also the intelligence gathered in this database is exploited within the intelligence network in order to identify possible high threat personnel. The worry is not so much that the personnel itself may engage in rhino poaching, but rather that they may sell information of the whereabouts of rhinos to known poachers. The intelligence network also uses social media sites, like Facebook, in order to detect connections of personnel to persons under the suspicion of being poachers.

5.1.5 Ongoing Research Projects and "Voluntourism"

The Olifants West Nature Reserve region in Balule Nature Reserve is the setting for the Research and Voluntourism Camp of Transfrontier Africa, a non-profit organization founded and managed by Craig Spencer. The camp includes basic accommodation and represents an education opportunity for aspiring ecologists and conservationists, as well as the interested tourist. The camp regularly hosts international researchers from the fields of ecology, conservation, biology, and, more recently, criminology.

In addition to the ongoing research projects, the camp also houses so-called "voluntourists". Voluntourists are travelers who want to engage in the conservation and research objectives of Olifants West Nature Reserve. Throughout their stay, they learn about conservation and ecology, as well as about performing quantitative and qualitative research. Furthermore, they also learn about the poaching issue, as well as the measures in place to prevent it. It allows for hands-on experiences in the bush, in the anti-poaching measures, as well as the experience of living in a "big 5" environment in an unfenced camp with only solar power. The research projects and Voluntourism initiative are as much a method of raising awareness, as they are a method of fundraising for ongoing anti-poaching measures and needs.

5.1.5 Other proactive measures

As outlined above, one of the advantages of situational crime prevention lies in its flexibility and creativity, enabling managers and law enforcement to create measures, which cater to their specific situation. At Balule Nature Reserve, the Armed Response Unit within the reserve has adopted some more unusual measures to "fix" vulnerabilities the lay of the land presents them with.

One of these rather unconventional approaches was to outfit the trees close to ports of entry along the river and the railway line with solar lights, which charge their batteries during the day and will light up at night. This may signal potential intruders activity at the port of entry, and force them to desist from entering into the reserve out of fear of detection and apprehension. These solar lights aid to secure the reserve, amend vulnerabilities and improve overall reserve security at low monetary cost. With the same intention of producing the perception of risk of detection and apprehension, the Armed Response Unit has taken to releasing helium balloons with glow sticks attached. Poachers may mistake the glow these emit for a sign of activity of an air support unit, a drone, or other "eye in the sky" and may therefore desist from entering the reserve in this area (V. Barkas, personal communication, January 23, 2014).

Another idea currently being explored is the creation of "cardboard rhinos". The plan is to manufacture rhino-shaped hard plastic decoys and place them within hot spots throughout the reserve. Picket sites where members of the Armed Response Unit are stationed will then be placed around these "cardboard rhinos". Should a poacher shoot at one of the "cardboard rhinos", the Armed Response Unit members will dispatch from their pickets and arrest the offender.

The additional advantage to this measure is that in the process no actual rhino is wounded or killed, while lessening response time and heightening chances of arresting intruders. What may make this approach a viable solution is the fact that if poachers operate at night they may not be able to distinguish a "cardboard rhino" from a live one. Yet, it is imperative to keep in mind, that the implementation and location of these "cardboard rhinos" has to be kept covert. As soon as it becomes public knowledge, the effect of this measure may be lost. Furthermore, it is questionable whether potential offenders will be duped like this on a permanent basis, so this may only be a very short-lived approach.

5.2 Threat Response Measures at Balule Nature Reserve

5.2.1 Hot Spot and Buffer Zone Anti-Poaching Patrols

The research on rhinos and their range and terrain preference, compiled as "green intelligence", as well as the identification and analysis of intrusions into the reserve, compiled as "red intelligence" have resulted in the identification of so-called hot-spot areas. These hot-spot areas are where the location of assets, reserve weaknesses, and intruders converge, as figure 5 below displays. Cohen and Felson (1979) based their The Routine Activity Theory on this very convergence (Cohen & Felson, 1979, p. 589) and the response to an identified hotspot is targeted towards the situational context.

In order to identify a poaching hotspot, it is absolutely necessary to know the location of targeted animals. The identification of weaknesses is mostly based on the lay of the land, as well as any knowledge gained from past incidents. One distinction made, however, is the differentiation between a poaching hotspot and an intrusion hotspot. While a poaching hotspot is influenced by where the threatened animal is located, an intrusion hotspot can be identified by vulnerabilities due to the location itself.

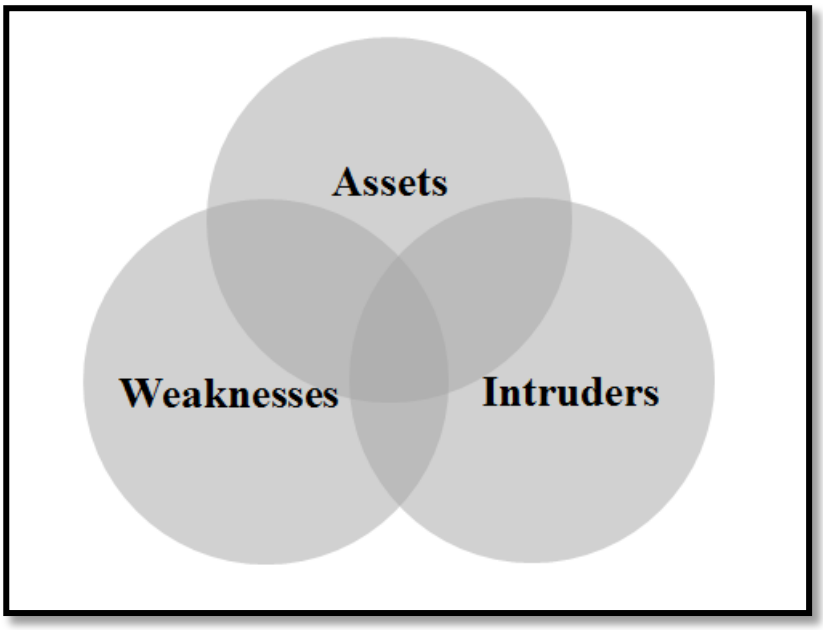

Figure 5 - Illustration of hotspot identification (© E. Reuter, 2014)

This process of analysis can most fittingly be termed "gathering red intelligence" (C. Spencer, personal communication, January 21, 2014; R. Ahlers, personal communication,

January 22, 2014). The intruder in this equation is somewhat of an unknown. Yet, as elaborated above, situational prevention techniques do not require intruders to be identified.

At Balule Nature Reserve, intrusions have been detected and followed up on to identify the port of entry and the distance traversed to attain a target. This information is collected in order to identify where weaknesses and targets merge, identifies a hotspot, and creates "red intelligence" (C. Spencer, personal communication, January 21, 2014; R. Ahlers, personal communication, January 22, 2014). The number and location of hotspots is dependent on the number and location of assets, and their intersecting with weaknesses of the reserve. The result is an increased need for management and patrol attention towards these hotspots. Furthermore, what has to be taken into account is the fact that manpower, as well as financial and material resources are very limited and will have to be targeted to the identified hotspots and tailored towards the most vulnerable times. Currently, it is impossible to cover all of the hotspots permanently.

In order to relieve some of the poaching pressure from the reserve, a 24-hour standby tactical unit has been implemented in addition to the armed response unit stationed within the reserve. It is the tactical unit's responsibility to respond to various identified threats and leads outside of the reserve's boundaries in order to create so-called buffer zones around it. The aim of this measure is to drive threats further away from the reserve, as well as remove threats from the local communities adjacent to the reserve, and to intercept threats before they reach the reserve itself.

Moreover, this approach in turn led to many opportunities to gather more intelligence on suspected poachers from local communities. The concept of hotspot patrolling and buffer zone patrolling can be classified as a measure of supplying formal surveillance (Clarke, 1997, p. 18). It is very much geared towards the actual situation on the ground and is in essence a concept of intelligence-led policing.

5.2.2 The Black Mambas Anti-Poaching Unit

The Environmental Monitors signify a dual-purpose approach. First and foremost, they are a visual policing component, i.e. "boots on the ground". Secondly, they serve as "eyes and ears" due to patrolling within the reserve wherever needed. The reserve hopes to eventually increase their number of Environmental Monitors to one per 1000 hectares. For the Olifants

West Region in Balule Nature Reserve the Environmental Monitors are represented by the Anti-Poaching Unit the "Black Mambas", which will be used as an example to illustrate the concept.

In line with the overall approach of social change and local ownership, the decision was made and implemented to hire only from local communities and, for the first time, to hire females. The Black Mambas initially consisted of four female and three male Environmental Monitors. Most strikingly, the interviews with the first members of the Black Mambas revealed that all of the members of the unit had formerly been unemployed, and now their income sustains six people on average. All of the members of the Black Mambas declared that they need this income in order to provide for their families, as they are the sole breadwinners.

The Black Mambas work on a rotational basis of 21 days of work and ten days of leave. In their periods of leave, they go back into their home communities to their families, and during their work period, they are housed in a staff compound on the reserve. During their periods of work, they receive staff rations, including fresh meat and fruits, which allows them to contribute their income solely for their families without having to buy food for themselves while staying within the reserve.

In addition to these monetary and material benefits, they receive proper uniforms, boots, and work clothes from the reserve without having to pay for any of it. On a routine basis, they patrol the reserve fence and the buffer zone, aid in gate operations and road blocks, remove snares and alien vegetation, and relay all gathered information to their commanding officer. The use of the Black Mamba Anti-poaching Unit can be classified as a measure of "surveillance through employees" (Clarke, 1997, p. 18) and extending the guardianship (Cohen & Felson, 1979) of the reserve.

In order to provide the Environmental Monitors with opportunities for further qualification, building curriculum vitae, and upward mobility and development, the reserve engages actively in their training. The standard training for members of the Black Mambas is in hand-to-hand combat, search and seizure, arrest and court procedures, creation of statements and dockets, handling evidence, chain of custody of evidence, road blocks and gate operations, legislation, snake handling, alien vegetation removal, snare detection and removal, and weapons handling, safety and certification, resulting in attaining a security clearance (C. Spencer, personal communication, January 21, 2014).

5.2.4 K9 Support

The Black Mambas Anti-poaching Unit is supported by the permanent presence of a working dog. “Shaya”, the wildlife detection dog, is trained in the detection of weapons, ammunition, ivory, and rhino horn, and is an integral part of the overall strategy. He assists with crime scene processing, as well as gate operations on a regular basis. Furthermore, he and his handler are dispatched to neighboring properties for assistance if need be. The four year-old Belgian Malinois was purchased and trained in Germany by a collaboration of the non-profit organization “Rettet das Nashorn” (Rettet das Nashorn, 2014, para. 5) and the German Police in Hessen. After completion of his training he was transported and donated to Craig Spencer in Balule Nature Reserve.

While permanently stationed in the Olifants West Region, Shaya and his handler are subject to call out to wherever their capabilities are needed. Shaya’s record so far consists of the successful detection of eight weapons, 112 rounds of ammunition, and a variety of other poaching equipment, like machetes and silencers (C. Spencer, personal communication, January 21, 2014). Furthermore, his presence at the gates serves as a natural deterrent for potential offenders, as well.

In the classification of situational prevention techniques, the use of a detection dog like Shaya can be seen as a dual measure. His detection capabilities simplify the control of facilitators, such as weapons and ammunition, and his detection capabilities for rhino horn, and ivory help in the category of denying the benefits of a crime when successful in detecting contraband before it can leave the reserve. This not only stems the flow of this contraband to the illegal market, but also directly denies profit to the perpetrator, and subjects him to judicial proceedings and possibly punishment.

5.3. Measures to Safeguard Integrity

The Balule Rhino Conservation Model encompasses a variety of integrity measures, supplementing the proactive and threat response measures and aiding in upholding the integrity of the reserve and its employees. One of these measures is mandatory polygraph testing for all employees tasked with responsibilities of anti-poaching work. Not only may this aid to identify possible poacher informants within reserve structures, it is furthermore a safeguard against outside allegations of personnel being involved in criminal activity. The failure to appear for testing without a valid explanation for the first time will result in a written reprimand and

rescheduling of testing. In case the employee fails to appear for the rescheduled test as well, dismissal from employment is the result. However, should an employee not pass the polygraph test the stakeholders will conduct further investigation into the results, and, if need be, reassign that person to tasks other than anti-poaching.

The Environmental Monitors are obliged to carry a GPS tracker during their patrols on which they mark animal and snare locations, alien vegetation location and track their patrol route on a daily basis. Again, this serves a dual purpose. Not only does it free the Environmental Monitors from suspicion of being involved in poaching activity, it also holds them accountable to the task they are hired, trained and paid for, by enabling the managers to track their movements in the reserve.

The Armed Response Unit, as well as the Tactical Unit, is equipped with trackable radios. This feature allows the Joint Operation Center to remotely track these units and their movements in the reserve. It also allows the Joint Operation Center to remotely switch on the radios and listen in to what is happening. This is foremost a measure of safety and security in case of a high-threat situation and serves to locate the unit and distinguish what kind of threat they are facing. It can, however, also be used to listen in to conversation randomly, in order to identify whether an individual unit member may be passing on information or discussing engaging in poaching among each other (R. Ahlers, personal communication, January 22, 2014).

Lastly, all information relayed to the individual anti-poaching unit member is limited and usually supplied short notice in order to curb possible temptation to relay such information to anyone for whom it is not intended. Environmental Monitors and Armed Response Unit members alike will not learn their daily patrol route and picket site for overnight stays until the very beginning of their workday. Furthermore, only the team leaders of the Armed Response Unit are privy to the disseminated “green intelligence”, which is provided as a map for them in order to coordinate their patrols respectively.

In the classification of situational prevention techniques according to Clarke (1997) these measures of safeguarding integrity can be classified in the bracket of “reducing temptation” (Clarke, 1997, p. 18). Reducing temptation in this regard means reducing the temptation to pass on information necessary for poachers in their risk-benefit analysis prior to the commission of the crime itself. By safeguarding the integrity of its personnel and the reserve itself, this flow of information can be subdued, if not eliminated entirely, which in turn may result in a potential

poacher lacking the necessary information on this location to determine risk, effort and reward, and hence desist from targeting the reserve.

6. Summary Table of Situational Prevention Techniques

Increasing Perceived Effort	Increasing Perceived Risks	Reducing Anticipated Rewards	Removing Excuses
1. Target Hardening • Rhino collaring • Intelligence-led patrols • Reducing target visibility from outside a reserve	5. Entry/Exit screening • Gate Operations • Search Procedures for vehicles, persons, personal items and luggage • ID of contractors & service providers	9. Target Removal • De-horning • Translocation	13. Rule setting • Signage of reserve rules at gates • Signage of legal obligations concerning poaching at gates
2. Access Control • Entry and Exit screening Identification of persons entering and exiting • Visible & maintained fence • Employee Database	6. Formal Surveillance • Pro Track Armed Response Teams • UAV/Drone Surveillance • Air Support by Helicopter and/or light Aircraft	10. Identifying property • Horn Infusions • Micro-chipping horn • Rhino collaring • Ear-notching rhinos • Signage at fence-line and at other ports of entry	14. Stimulating conscience • Repeated warning signage • Spreading Awareness among visitors, clients & employees • Radio/TV adverts to raise awareness
3. Deflecting Offenders • Visible Policing • Fence Patrols • Posting of Warning Signs • Randomizing patrol routes & times • Extensive Ecological Management/ "Sanctuary in a Sanctuary"	7. Surveillance by employees • Black Mambas Anti-Poaching Unit • Warden Team • Ad-hoc stop and search of vehicles on the reserve • Reporting of vehicles/persons by game drives over radio communication	11. Reducing temptation • Signage along fence • Horn Infusions • Rotational assignment of Armed Response team • Short-notice deployment to picket sites • GPS-traceable radios for patrols • Polygraph testing of employees & security providers • Media Publications	15. Creating Inhibitors (formerly: Controlling dis-inhibitors) • Environmental education for children and adults of local communities • Creating vested interest by employment/benefits • Whistleblower Program (possibly with benefits for information)
4. Controlling Facilitators • Detection Dog • Gate Operations • Weapon Registration & Regulations	8. Natural Surveillance • Guests, Lodge Owners, Tourism Operators, General Public • Portable GPS transmitters for service provider vehicles	12. Denying benefits • Detection Dog • Horn Infusions • De-snaring and emptying snares before collected • New methods of detection, i.e. radioisotope marking	16. Facilitating compliance • Environmental Monitors • Green Kidz • Community work via Pro Track

Figure 6 - Table of Situational Prevention Techniques supplemented with the anti-poaching measures at Balule Nature Reserve (© E. Reuter, 2014).

Displayed above in figure 6, Clarke's (1997) original table of situational prevention techniques is supplemented with the respective applicable proactive, threat response, and personnel integrity measures at Balule Nature Reserve. Highlighted in red are measures that are either not in use, i.e. de-horning, due to ecological reasons, or not yet in use, i.e. drone surveillance, due to financial constraints. They could, however, become relevant in the future.

6.1 Discussion of Strengths and Challenges

The multi-stakeholder framework employed at Balule Nature Reserve, based on Routine Activity Theory, Rational Choice Theory and Situational Prevention Measures, possesses a variety of strengths in order to counter poaching threats. One of its strengths is the inclusion of employees from local, disadvantages communities, and by that the creation of local ownership and vested interest, lasting social development, and the opening of an employment industry for women they have historically never had access to. It is one of the few initiatives in this region, which actively engages in changing the design and fabric of the local society.

Furthermore, the strength of this framework lies in the independence of the three tiers of the pyramid. While hierarchically organized and somewhat dependent on the flow of information among each other, the three tiers largely work in autonomy from another. This is one of the important elements of safeguarding the integrity of the model. The three tiers work towards the overall goal of securing the reserve against poaching threats independently, with different individual responsibilities, methods and equipment.

Another main strength of this framework is that it is in fact tailored to the situation on the ground and is very adaptable, albeit sometimes limited by finances. Be that as it may, it tackles the most imminent threats of poaching for this reserve. As Clarke (1997) highlighted "offenders must be expected to test the limits of the new defenses and to be successful sometimes in identifying vulnerabilities" (Clarke, 1997, p. 27). This is to say that while the measures employed at the moment seem to be effective, essentially the model at Balule Nature Reserve will need to be constantly analyzed and amended as needs arise and new vulnerabilities are discovered.

One of the many challenges of this framework is that it is currently very center-pivot, as well as management-intense, and financially strapping. The framework at the moment is built on the leadership, devotion, motivation, capacities, and capabilities of the warden of the Olifants West Region, who in addition to managing the anti-poaching initiative, handles the detection

dog, and serves as a regional warden, managing all of the concerns and duties this position brings with it. The wardenship is a fulltime occupation to begin with, leaving aside the additional strain the anti-poaching initiative adds.

Furthermore, looking at the financial side of the program, it becomes clear that the framework as it is cannot be sustained indefinitely. The framework operates on an estimated budget of 1,14 million ZAR (approximately 80.786€) for the first three years (T. L. Tochterman, personal communication, February 5th, 2014), solely dedicated towards anti-poaching measures. The budget is raised through charities, non-profit organizations, and international donors who contribute towards this cause. Common sense dictates that sooner or later the current donors will experience a certain "donor fatigue[2]", which means they will no longer give to the causes they formerly donated.

It is an absolute necessity to find ways to lessen financial demand, as well as finding alternative income options in order to sustain the model at the current rate. Also, there is no option to sell some of the current rhinoceroses of the Balule population for hunting, a practice that has been employed over the last years to raise funds to support game reserve operations. One argument against this practice is that the population numbers are dwindling as is with poaching incidents and, therefore, populations may be reduced to the point of not being ecologically viable anymore. Furthermore, the ensuing responses from the press and the public, should this practice appear in the media, will result in a substantial loss in image for Balule Nature Reserve. As ecologist Aldo Leopold (n.d.) put it strikingly "[t]o insist that wildlife pays for itself is like burning your furniture to keep the house warm" (Great Plains Conservation, 2012/2013, para. 4). It is logically incomprehensible to either hunt the species you try to protect, or to hunt another big mammal species to pay for the expenses of another species, i.e. elephant hunting to pay for rhino conservation.

Looking at the larger context of rhinoceros poaching in South Africa, the interviews with the stakeholders connected to the Balule Rhino Conservation Model revealed, that one of the biggest challenges is found in the realm of current judicial and law enforcement capacities and capabilities. Firstly, Balule Nature Reserve was created as a conservation territory effort by

[2] Donor fatigue – „a general weariness and diminished public response to requests for aid to needy people or donations to charitable causes" (donor fatigue. (n.d.). *Dictionary.com's 21st Century Lexicon*. Retrieved March 11, 2014, from Dictionary.com website: http://dictionary.reference.com/browse/donor fatigue)

various private landowners and is in all respects private land, so there are no governmental policing efforts inside the reserve, which could aid in the prevention, detection and investigation of poaching incidents. Furthermore, while a poaching incident may be reported at any police station, it will only be followed up and investigated by the Directorate for Priority Crime Investigation (DPCI), also called the Hawks (Corruption Watch South Africa, 2014, para. 2).

The Hawks investigate cases of corruption, organized crime, and money laundering and racketeering, as well as all other so-called "priority crimes". Rhino poaching has been given priority crime status (Munusamy, 2013, para. 1), and therefore falls under DPCI/Hawks investigative obligations. For the province of Limpopo, the Hawks office is located in Polokwane, over three hours away from Balule Nature Reserve, and consists of four officers investigating rhino related offenses (C. Spencer, personal communication, January 21, 2014). Bearing in mind the numbers of poaching incidents, common sense dictates that these investigative capacities are not large enough in numbers to follow up on every rhino poaching incident in the region.

What adds to the dilemma is the fact that there are no special environmental courts, so-called "green courts", in South Africa anymore. Poaching incidents and other environmental crimes currently fall under the National Prosecuting Authority's obligations, and will be handled by provincial and lower district courts. South Africa's environmental court in Hermanus, first established in 2003 as a pilot project, had been created to combat poaching offenses concerning marine resources (Gosling, 2006, para. 1), mainly abalone poaching. At times, it resulted in 85% conviction rates for marine poaching incidents (Gosling, 2006, para. 2), in which bail often was denied and jail sentences handed out. Not only did the environmental court provide adjudication for environmental offenses, it also freed other courts from having to deal with the large numbers of cases involving the environment.

Due to the large numbers of crime in general, the court system in South Africa is overburdened (K. Brebner, personal communication, February 6th, 2014). In addition, prosecutors and judges often lack specialized knowledge of environmental crimes and harm (K. Brebner, personal communication, February 6th, 2014). For the problem of rhino poaching and the incident numbers the South African legal system has to deal with, it would be beneficial to consider reestablishing the environmental court in order to deal with legal issues involving environmental crimes and offenses. It would also add credibility to the claims of rhino poaching

being a “high priority crime” and may aid in removing the notion of permissibility. The reestablishment of such courts would certainly aid in altering the perception of risk for the perpetrator, especially when it comes to celerity, severity, and certainty of punishment.

7. Conclusion

In order to better understand the crime of rhino poaching and the measures aimed at countering it, established criminological theory provides the framework in order to analyze the situational factors involved. Cohen and Felson's (1979) Routine Activity approach explains the tempo-spatial convergence of the three basic factors for a crime to occur, and led to the conclusion that, leaving offender motivation aside, it is beneficial to focus on the two malleable factors of suitable target and absence of capable guardianship in order to influence offender decision-making. In conjunction with the Rational Choice Theory (Cornish & Clarke, 1986), the Routine Activity Theory supports the conceptualization of "choice-structuring properties" (Cornish & Clarke, 1987, p. 935) for the crime of rhino poaching in order to investigate the decision-making processes of potential offenders.

Cornish and Clarke's (1986) Rational Choice Theory highlights the fact that an offender is a conscious, thinking individual who performs a cost-benefit analysis when considering committing a crime in general, as well as when considering a specific location or target (Cornish & Clarke, 1986). Ways to modify target suitability, the extension of guardian capabilities, as well as the analysis of the "choice-structuring properties" (Cornish & Clarke, 1987, p. 935) in order to prevent crime, have in turn resulted in and further influenced situational crime prevention techniques (Clarke, 1997). This assessment implies an element of controllability for crime in general.

The analysis of the "choice-structuring properties of effort, risk and reward" (Cornish & Clarke, 1987, p. 935) for the crime of rhino poaching led to a better understanding of the aim and requirements of the situational crime prevention measures in place at private nature reserves. Due to the point in time this assessment takes place for a possible offender, the choice of terminology warrants the extension of the three "choice-structuring properties" to anticipated effort, perceived risk, and expected reward. However, what became apparent when examining the "choice-structuring properties" (Cornish & Clarke, 1987, p. 935) and the intricacies of the crime of rhino poaching is that the poaching war is actually fought on various fronts at once. The legislative shortcomings seem to be adding to the low perception of risk for a potential offender. The lack of a visible law enforcement effort to counter the problem around and in private nature reserves exacerbates the anticipation of a relatively low effort necessary to commit the crime.

The fact that the demand for rhino horn persists fuels the anticipation of a high reward. Additionally, these are problems, which an anti-poaching initiative alone cannot combat.

Inadvertently, the Balule Rhino Conservation Model is soundly based on criminological theory. It was not criminology, but rather common sense, which sparked the decision that measures will have to be taken to change the equation of risk, effort, and reward for the offender. It is the explicit aim of these measures to heighten the perception of risk and effort, while at the same time reducing, or ideally completely denying, the anticipated rewards. In essence, it is the expressed goal to make this reserve the most undesirable, miserable place for potential offenders in order to dissuade them from offending at this location, albeit without employing a general "shoot-to-kill" policy.

A "shoot-to-kill" policy, in addition to not being a legally permissible measure, is feared to encompass more harm than benefit due to seriously hindering community involvement, raising the spirits of the community, and local ownership in the protection of endangered wildlife. It cannot be considered a success to take human lives on a daily basis by simply shooting poachers as this will surely spark acts of retaliation and estrangement from local communities, and thereby exacerbate the situation. Furthermore, as V. Barkas and C. Spencer emphasized during their interviews, there is no shortage of people willing to fill the open ranks in poaching groups.

The employment initiative of women from disadvantaged communities as Environmental Monitors is hoped to spark needed social change and rethinking. It is currently being expanded by hiring and training 20 new Environmental Monitors from disadvantages communities (C. Spencer, personal communication, March 10th, 2014) and deploying them as "eyes and ears" of the reserve in regions which formerly had no APU support. This development aims at seriously increasing guardian capacities of the reserve and thereby increasing the factors of perceived risk and anticipated effort for potential offenders. By providing access to an employment field to which women have historically never had access, the opportunity to earn a sustainable income from wildlife conservation, and the opportunity for education and professionalization, the stakeholders of the Balule Rhino Conservation Model created a one-of-a-kind initiative.

Furthermore, it is hoped that the environmental education provided within this initiative will eventually be passed on to these women's children. The hope is that it will result in a trickle-down effect, as well as multiplication of knowledge and interest in conservation, and thereby create a sustained vested interest within future generations.

The results of this study open up many interesting avenues for future research. One possible line of inquiry in the field of criminology could be an examination of whether and how the employed situational prevention measures changed over time, as well as an examination of their efficiency and efficacy. In addition to the field of criminology, this multifaceted program also entails future research opportunities, i.e. in the field of sociology, governance, law, tourism and hospitality studies, humanitarian development studies, as well as the field of environmental leadership and management.

However, in the larger context of transnational environmental crime, it became clear that initiatives such as the one under examination herein are merely buying time. They are but one stepping-stone in regard to the whole problem, trying to stem the supply to the illegal market. Created in the factual absence of governmental regulation and enforcement of the problem, they are trying to save rhinos, while South Africa is contemplating wholesale. Rhino poaching is a transnational environmental crime. The horn is smuggled mainly to Asia, and the proceeds are supposedly laundered, inter alia, to finance terrorism (Foley, 2013). South Africa's proposal of legalizing the trade in rhino horn is sending a message of helplessness, the message of "if you can't beat them, join them" (Watson, 1932, as cited in Shapiro, 2009, para. 2).

South Africa is not capable to enforce the problem, so the push for legalization is the attempt to out-design the crime, and possibly making some profit in the process (Kuhumbu & Halliday, 2014). The notion is ludicrous and, if pursued and implemented, will afford impunity to these illegal actors. Not only the sizes of national stockpiles in governmental and private possession to supply a legal market are currently not assessed, the demand for rhino horn is likewise unknown at current times. Due to the trade in rhino horn being underground, assessment is difficult, if not impossible. The results a legalization of trade would produce are just as much an unknown.

However, a study commissioned by TRAFFIC in 2013 outlined that, of those persons currently not using rhino horn, 16% are so-called "intenders" (TRAFFIC, 2013, p. 2), who are willing to buy once their finances allow them to do so. TRAFFIC's conclusion is a hint at what is to come and emphasizes the notion that the market may be further increasing with availability of the product. The pro-trade argument that the proceeds of stockpile sale revenues will benefit conservation in South Africa is an uncertain and unprecedented one, and the experiment has taken place and failed once already with the legalization of sale of ivory (Endangered Wildlife

Trust, 2013, p. 3). It is questionable whether this very experiment of trial and failure has to be repeated for every species at stake. However polarized the debate on the legalization of the trade in rhino horn is, one has to seriously question the motives behind a push for legalization, who endorses it, and who will benefit from it. Taking into account that South Africa at present largely fails to sufficiently regulate the existing domestic trade options, the suggestion of a highly regulated, legal international trade scheme does neither seem promising, nor realistically feasible. One thing is certain: international commercial trade will not benefit these endangered animals in any way, nor will it end the onslaught of rhino poaching incidents.

8. Recommendations

The measures in place at Balule Nature Reserve can be, as performed above, classified as Situational Crime Prevention Techniques. However, in order to further sustain the model it became evident that it is necessary to propose several ideas for changes to the existing model. These recommendations are by no means meant to be exhaustive and most of them are certainly dependent on the finances available. Nevertheless, in order to successfully sustain the model, it will be necessary to expand the measures currently in place.

As soon as possible, the existing measures should be supplemented by the use of air support through a drone or lightweight aircraft in order to increase the surveillance capacities of the model. This would come with the distinct advantage of being able to better coordinate ground forces and, by that, to seriously reduce response time to incidents. Concerning financing a drone, the idea of making it commercially beneficial to lodges and the reserve should be further explored, possibly asking these entities to share in the costs for purchase, as well as maintenance. A drone could, while flying over the reserve, log the animals spotted during flight into a database. The database could be made available to contributing lodges in order to improve their game drive routes, which would then improve their own profile and attract more guests, while at the same time seriously contributing towards a conservation effort. Furthermore, a drone could aid in performing annual game counts on the reserve and thereby reduce expenditures for helicopter fuel and airtime, as well as pilot remuneration.

A second recommendation in order to reduce expenditures for the anti-poaching initiative is what ecologists call “extensive ecological management”. The fact that populations of rhinoceroses are currently traversing over 50,000 ha of bush makes their protection very difficult, if not impossible. With the poaching numbers having increased every year since 2007, the population numbers of rhinoceroses are dwindling to the point of no longer being able to reproduce anymore due to the odds of ever meeting on such a vast space. Therefore, until South Africa finds a way to adequately prevent, enforce and investigate rhino poaching, until consumer demand reduction projects in Asia have taken effect and resulted in a credible threat reduction, a “sanctuary in a sanctuary” approach may be the most viable short- and mid-term solution. This would mean using collected “green intelligence” to determine the habitat range of the majority of the rhinoceroses of the two species in this reserve, and, if necessary and financially possible, to relocate the rest of the populations into the proposed sanctuary. The benefit of the “sanctuary in a

sanctuary" method is not only the condensation of the population to numbers, which are then able to reproduce, achieved by relocating existing populations, it would also severely decrease the management and personnel needed to protect them. The "sanctuary in a sanctuary" will have to be fenced and should be guarded like the proverbial "Fort Knox". Whereas at the moment, the patrol efforts are spread out over all of the reserve, the "sanctuary in a sanctuary" approach would result in definite knowledge of where the protected assets are, a shortened response time, and higher chances of arrest, should an offender nevertheless decide to try. Overall, this strategy would definitely aid in tilting the cost-benefit equation of potential offenders to a disadvantageous outcome.

In realizing that this is an intense ecological intervention, it may, however, be a way to save a population of rhinoceroses viable to breed, and to resurrect the species numbers from almost-extinction, as has been done before. A possible disadvantage to this approach will be the fact that these endangered species would be less commercially available and visible for tourism providers in the reserve. However, this could easily be justified and explained to incoming guests, and the lodges' support for this measure could seriously reinforce their claim of engaging in conservation efforts.

Should the latter recommendation of a "sanctuary in a sanctuary" not be pursued, there are a variety of other situational prevention measures able to further increase the factors of anticipated effort, perceived risk, and expected reward for a potential offender. By way of example, to increase guardianship, Transfrontier Africa could pursue the idea of offering an environmental education day for guest visitors of the lodges on the reserve, allowing them to gain knowledge on the Balule Rhino Conservation Model. In her interview, Lauren Saad (Ezulwini Lodges) highlighted the fact that most of the clientele coming into the reserve do not have adequate knowledge that there is a poaching crisis in South Africa. Educating visitors would aid in spreading awareness of the rhino poaching problem, encourage visitors to not buy trinkets made of endangered animal products, and stimulate people's conscience. It would also allow Transfrontier Africa to boost their profile as a provider of environmental education, as well as provide an additional means of income for the Balule Rhino Conservation Model.

In addition, if financially possible, the current regime of publishing non-sensitive information on the Balule Rhino Conservation Model through various media channels should be upheld. This will further aid in raising awareness and spreading the knowledge that this reserve

is not a suitable venue at which to offend by creating the perception of a very high risk and effort location. Lastly, the stakeholders of the Balule Rhino Conservation Model should explore ideas of how to create and finance a Whistleblower Program, possibly offering monetary rewards for information on offenders and planned offenses. While this measure implies a certain need of management and verification of information, it could prove to be beneficial in order to gather more intelligence and adjust operations in and around the reserve accordingly.

Another situational crime prevention measure, which Balule Nature Reserve itself should pursue is the practice of mandatorily outfitting contractors and delivery vehicles with portable GPS transmitters in order to lessen the risk these actors inherently pose to the reserve's security profile.

Furthermore, the signage at the legal and makeshift ports of entry should be improved and increased. The signage should outline the regulations applicable to poaching, informing all incoming persons of obligations and rules accordingly. This measure would aid in removing excuses and permissibility of the offense.

Lastly, Balule Nature Reserve should explore the legality of denying visitors the right to bring weapons into the reserve. This measure, if legally feasible, would seriously aid in controlling facilitators. If it is not legally possible to deny visitors the right to bring weapons, the reserve should at least consider making their declaration and registration at the entry gates a mandatory measure.

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I hereby declare that I have developed and written the above Master's Thesis completely by myself and have not used sources, means, or aids without their declaration in the text. Any thoughts from others, or literal quotations, are clearly marked. This Master's Thesis was not used in the same or in a similar version to achieve an academic grade at a different university and is not being published elsewhere.

Stockstadt am Main, 19th of June 2014