Retrospective analysis of the outcomes of animal crime scene investigation in Thabazimbi from 2013-2015

by

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DECLARATION

I, Thomas Ishmael Ramalekana, do hereby declare that the research presented in this dissertation was conceived and executed by myself and, apart from normal guidance from my supervisors, I have received no assistance.

Neither the substance, nor any part of this dissertation, has been submitted in the past or is to be submitted for a degree at this University or any other University.

This dissertation is presented in partial fulfillment of the requirements for the degree MSc in Production Animal Studies.

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LIST OF ABBREVIATIONS

ARC	-	Agricultural Research Council
AGL	-	Animal Genetics Laboratory
BS	-	Blue Star
CSIR	-	Council for Scientific and Industrial Research
CD	-	Compact Disk
CSI	-	Crime Scene Investigator
CSM	-	Crime Scene Management
CITES	-	Convention on International Trade in Endangered Species
CAS	-	Criminal Administration System
CPA	-	Criminal Procedure Act
DNA	-	Deoxyribonucleic Acid
DEAT	-	Department of Environmental Affairs and Tourism
DAFF	-	Department of Agriculture, Forestry and Fisheries
DPP	-	Director Public Prosecutions
EMI	-	Environmental Management Inspectors
FSL	-	Forensic Science Laboratory
GPS	-	Global Positioning System
GSR	-	Gun-Shot Residue
I.O	-	Investigating officer
IUCN	-	International Union for Conservation of Nature
ISIS	-	Information System Identification of Suspects
LCRC	-	Local Criminal Record Centre
RhODIS®	-	Rhino DNA Index System
TAR	-	Thabazimbi Animal Rescue
SAPS	-	South African Police Services
SANBI	-	South African National Biodiversity Institute
STR	-	Short Tandem Repeat
SARS	-	Severe Acute Respiratory Syndrome
MI	-	Media Information

NEMBA	-	National Environmental Management: Biodiversity Act
OCU	-	Organized Crime Unit
UP	-	University of Pretoria
U.S	-	United States
UV	-	Ultraviolet
STR	-	short tandem repeat (STR)
VGL	-	Veterinary Genetics Laboratory
WWF	-	World Wildlife Fund

ABSTRACT

Monitoring and Evaluation of case outcomes is a useful tool in improving animal crime scene investigations. The methods used to collect evidence in the field in animal crime cases need to monitored and improved where weaknesses are found in order to secure arrests and successful prosecutions and effective sentences. The low percentage of animal crime cases reported and effectively prosecuted reduces the confidence of the public in the police's ability to investigate these crimes. Wildlife crime, particularly crimes related to CITES listed species whose products such as rhino horn and ivory are traded illegally at extremely high prices is increasing exponentially. This study showed that only 8 out of 71 (11%) of animal related cases reported and investigated in the study area over the period 2013 to 2015 had guilty as a verdict, indicating that current animal crime scene investigation methods, especially in certain areas in the country, are not adequate to ensure successful prosecution of the majority of cases.

CHAPTER 1: INTRODUCTION

Animals are involved in crime in South Africa and elsewhere. The focus of this study is how animal crime scenes are investigated and managed in the Thabazimbi district of South Africa. The perception that there is a poor success rate in prosecuting animal crime offenders was the motivation for this study. Factors leading to conviction and prosecution of perpetrators of animal crime are analysed in the study.

1.1 Animals in crime

The animal may be involved in crime in one of three ways:

Animal as victim: Animals that have been abused do not have their interests represented in court. Instead, only the State is able to prosecute crimes against animals. Although the crime of animal cruelty is a crime against the State, it is also a crime against the animal that has interests independent of the State's interests. Some animals are neglected or abused. Other animals are stolen or illegally traded. Animals will often be seized as evidence and kept in protective custody.

Animal as perpetrator: Animals may be used as part of a criminal act for example when dogs are used to hunt illegally or to attack people. An animal may have been responsible for killing another animal, for example, when predators kill stock animals.

Animal as witness: An animal may be a direct or indirect witness in a human crime scene. Indirectly, animal hair or tissue may be left at a crime scene. The case of *Snowball the Cat* (Menotti-Raymond, David & O'Brien 1997), is particularly important since it represents the first case in which a conviction was made based on the presence of animal hair at a human crime scene. Alternatively, the animal may be a witness, for example, the case of a dog named 'Scooby' that became the first animal in the world to appear as a witness in a murder trial. Scooby was led into the witness box by a vet during a preliminary hearing to see how it reacted to a suspect. It is said to have "barked furiously" (Salter 2008).

Crime scenes involving animals must be investigated using the same principles as any other crime scene. Crime scene investigation entails more than just the Locard principle, for example, reconstruction of events, interpretation of observations made and measurements from a scene. Crime scene reconstruction uses scientific methods, physical evidence, logical reasoning, and their interrelationships to increase knowledge that surrounds the commission of an offence (Sharma, Khajja, Vashistha, Bairwa & Sharma 2010). The principle of crime scene

investigation is based on Locard's exchange principle. This idea was introduced by Dr. Edmond Locard (1877-1966). Locard speculated that every time you make contact with another person, place, or object, it results in an exchange of physical materials. He believed that no matter where a criminal goes or what a criminal does, by coming into contact with object, a criminal can leave evidence including deoxyribonucleic acid (DNA), fingerprints, footprints, hair, skin cells, blood, bodily fluids, pieces of clothing, fibers and more (Chisum & Curvey 2000).

Wildlife crime is a special case of animal crime in which wild animals are the victims and can include the illegal taking, possession, trade or movement of animals or their derivatives in contravention of international, regional, or national legislation. Wildlife crime includes amongst others, killing of wild birds, taking or removing the bird's or turtle eggs, poaching or illegal hunting, destroying bat roosts, trapping wildlife illegally, poisoning wildlife illegally, illegally importing, exploiting or trading in endangered species and making use of endangered species body parts in traditional medicines and as ornaments (Cooper, Cooper & Budgen 2009).

This study was motivated by a perception that there was a poor success rate generally in prosecuting animal crime offenders. The statistics in the study area of Thabazimbi, South Africa, show that out of 56 stock theft and 15 poaching cases reported in the area between 2013-2015, only 38 (34%) were successfully prosecuted. The Thabazimbi area includes the following police stations: Northam, Dwaalboom, Hoopdal, Cumberland, Rooiberg and Mogwase.

A total of 20 stock theft cases were reported in Thabazimbi in 2013-2015 and five suspects were arrested in three of these cases. A total of 11 stock theft cases were reported in Dwaalboom in 2013-2015 and eight suspects were arrested in four of these cases. A total of 14 stock theft cases were reported in Northam for stock theft in the years 2013-2015 and five suspects were arrested in three cases. Eight cases were reported in Rooiberg for the years 2013-2015 and two suspects were arrested in one case. Seven cases where reported for Cumberland for stock theft for 2013-2015 and in all the four cases, no arrest were made. Seven cases where reported for Hoopdal and in all seven cases no arrest were made (SAPS IBIS system 2015).

General stock theft statistics in South Africa 2014/2015.

The following statistics provide some background to the problems regarding stock theft in the country and the need to utilize sophisticated methods of investigation to improve convictions and consequently the confidence of the public in the police.

A total number of 181 cattle and 104 goats were stolen to the value of R2.7 million and only 3 cattle and 2 goats were recovered (Mashala 2013). In Limpopo and Northwest, one suspect was arrested for stock theft and was convicted as follows:

Limpopo:

Marble Hall CAS 77/07/2013 – 49 stud goats – 4 years imprisonment

Bela-Bela CAS 262/07/2013 – 54 goats – 4 years' imprisonment

Modimolle CAS 53/08/2013 – 34 cross breed cattle – 12 years' imprisonment

Mokopane CAS 147/08/2013 – 25 stud Bonsmara cows – 12 years imprisonment

North West:

Lethabong CAS 30/07/2013 – 65 Bonsmara cattle – 6 years imprisonment

Lethabong CAS 32/07/2013 – 9 cross breed cattle – 3 years' imprisonment

Lethabong CAS 55/07/2013 – 10 cross breed cows – 1st alternative charge, 12 years' imprisonment

Rustenburg CAS 1074/07/2013 – 45 Bonsmara cattle – 12 years imprisonment

Assen CAS 50/07/2013 – 5 cross breed cows – 3 years' imprisonment

Assen CAS 49/07/2013 – 29 stud Bonsmara cattle – 12 years imprisonment.

A total of 80 years' imprisonment was imposed and the accused has to serve an effective 16 years imprisonment on all 10 charges (SAPS 2015).

Eastern Cape:

Cedarville CAS 15/12/2014 - Stock theft and the successful prosecution and conviction of four suspects who stole 30 sheep. The four suspects were convicted as follows:

Suspect 1: 15 years of which 7½ years were suspended for 5 years

Suspect 2: 12 years of which 6 years were suspended for 5 years
Suspect 3 & 4: 10 years of which 5 years were suspended for 5 years.

Matatiele CAS 73/03/2015 - Stock theft occurred on 2015-03-15 when 58 sheep were stolen of which 45 sheep and 13 slaughtered sheep skins were recovered. A Lesotho citizen was arrested and sentenced to 8 years imprisonment of which 2 years was suspended for 5 years (SAPS 2015).

Free State:
On Friday 2015-10-16 members from Phuthaditjhaba and Kestell Stock Theft and Endangered Species Units conducted a joint tracing operation in the mountains next to the Lesotho border at Libeleteng following information of possible stolen livestock. Seventy cattle were recovered at different cattle posts of which forty six cattle were positively identified by the lawful owners. One suspect, a Lesotho citizen, was arrested while another four suspects fled over the border to Lesotho (SAPS 2015).

The extent of the problem of stock theft in South Africa
The impact of livestock theft is mainly economic but the emotional impact on the victims cannot be ignored. Economically, the crime affects the business enterprise livestock producers, irrespective of whether the producer is a commercial farmer or small-scale farmer, and is the largest obstacle in sustainable livestock production and food security (Khoabane & Black 2009). The establishment, involvement and roles of the social groups in reducing livestock theft have not yet been studied (Clack 2013). In South Africa, livestock theft is the only crime committed on farms which is indicated separately within the National Crime Statistics. In spite of this, the crime is neglected by researchers and the extent and impact of the crime is not understood within the criminal justice system or the academia (Clack, 2013).

1.2 AIM OF THE STUDY

The objectives of the study were:
• To compile a list of animal crime scenes attended in the Thabazimbi area in a specified period with a structured evidence set to evaluate how the crime scene was investigated and to provide the background and history of each case and outcome as a case report;
• To evaluate each process in each case in relation to the outcome such as a successful prosecution: The evaluation will take into account the:

- SAPS Training Manual requirements,
- Relevant Acts,
- Laboratory requirements.

• To compile a list of guidelines to improve the investigation of animal crime scenes in the Thabazimbi area.

Hypothesis

Current animal crime scene investigation methods in the Thabazimbi area are not adequate to ensure successful prosecution of the majority of cases.

CHAPTER 2: LITERATURE REVIEW

The literature reviewed will cover the following aspects: relevant acts with regard to animal crime, legislation, evidence collection, stock theft, poaching, wildlife trafficking and animal abuse.

The relevant acts pertaining to animal crime are as follows:

2.1 Criminal Procedure Act (Act No. 51 of 1977)

This Act relates to the gathering of evidence at a crime scene including animal crime scenes and gives investigators the power to collect all evidence related to the crime as part of their investigation. (Department of Justice n.d.).The Criminal Procedure Act provides for a number of ways in which the attendance of the perpetrator at his or her trial may be secured. The methods provided for in the Criminal Procedure Act range from issuing a written notice to the perpetrator, issuing a summons by the clerk of the court or issuing an indictment by the Director of Public Prosecutions (Department of Justice n.d.).

The Criminal Procedure Act also provides that the perpetrator may be arrested and be taken to court to stand his or her trial. This is, however, the most severe way of securing the attendance of the perpetrator in court and should be regarded as a last resort that may only be utilized if there are sound reasons not to utilize any of the other methods already mentioned (Department of Justice n.d.).

2.2 Legislation related to animal crime scenes

2.2.1 NEMBA Legislation

National Environmental Management: Biodiversity Act (NEMBA) of 2004 and its subsidiary legislation have been put in place for the protection of various species that are threatened or are otherwise in need of protection. It also provides the authority for consolidating fragmented biodiversity legislation in the country through the establishment of national norms and standards specific to certain particularly vulnerable animals (Department of Environmental Affairs n.d.). NEMBA prohibits anyone from engaging in a ‘restricted activity’ involving any

listed 'threatened or protected species' (listed species) without a permit. It authorizes the Minister of Environmental Affairs and Tourism to establish lists of species that are threatened or in need of national protection, further subdividing the class of 'threatened' species into those which are 'critically endangered,' 'endangered, and 'vulnerable' (Goitom 2013).

Investigators who deal with rhinoceros poaching or other wildlife crimes must know the NEMBA legislation and which species are listed by NEMBA. If a suspect is found with suspicious products which may have originated from a NEMBA listed species, samples must be taken for DNA testing to determine the species of origin.

2.2.2 Biodiversity Act, 2004 (Act No.10 of 2004)

The overarching aim of the National Environmental Management: Biodiversity Act 10 of 2004 (NEMBA) is to provide for:

- The management and conservation of biological diversity within South Africa;
- The management and conservation the components of such biological diversity;
- The use of indigenous biological resources in a sustainable manner;
- Fair and equitable sharing among stakeholders of benefits arising from bioprospecting involving indigenous biological resources.

The South African National Biodiversity Institute (SANBI) was established by the NEMBA, with the purpose (inter alia) to report on the status of the country's biodiversity and the conservation status of all listed threatened or protected species and ecosystems. NEMBA provides for a range of measures to protect ecosystems and for the protection of species that are threatened or in need of protection to ensure their survival in the wild, including a prohibition on carrying out a 'restricted activity' involving a specimen of a listed threatened or protected species, without a permit issued in terms of Chapter 8. Lists of critically endangered, endangered, vulnerable and protected species have been published and a permit system for listed species has been established.

The Biodiversity Act must be known by investigators as it provides a list of threatened or protected species as critically endangered, endangered, vulnerable, or protected. The list must be known by all animal crime scene investigators (Department of Environmental Affairs).

2.2.3 Stock Theft Act, 1959 (Act No. 57 of 1959)

The Stock Theft Act is implemented by the South African Police Service (SAPS). Its objective is to consolidate and amend the law relating to theft of stock and produce, where produce means the whole or any part of any skin, hide, horn or egg of livestock or any wool or mohair. The act achieves this objective through the following specific principles:

No person may possess, transport, handle, transfer, sell, purchase, acquire or supply animals or animal produce unless he or she is in possession of the prescribed documents and registers where applicable.

- No person may import animals or animal produce into or export animals or animal produce from the Republic, or cause any animals or animal produce to be exported from the Republic, unless he or she is in possession of the prescribed documents and registers.

- No person may, between sunset and sunrise, drive, carry or convey any animals or animal produce in any other way than in or on a vehicle unless the person is the owner, lessee or occupant of land where the animals or animal produce are driven, carried or conveyed over, unless otherwise prescribed.

- No person may, between sunset and sunrise, receive any animals or animal produce that have been driven, carried or conveyed in any other way than on or in a vehicle, unless otherwise prescribed.

- Notwithstanding the provisions of any other Act, animals or animal produce crossing the border out of or into South Africa must be identified with a permanent identification mark as is prescribed (Department of Justice n.d.).

Officers who investigate stock theft must understand this Act and know under which circumstances they must investigate cases of stock theft and how to deal with suspects, witnesses and animals involved. The collection of evidence and which evidence must be collected and who must be present during the collection of evidence, are stipulated in the Act.

2.2.4 Animal Identification Act, 2002 (Act No. 6 of 2002)

This Act is administered by the Department of Agriculture, Forestry and Fisheries (DAFF). Its objective is to consolidate the law relating to the identification of animals as declared by the Minister by notice in the Government Gazette. The Act compels livestock owners to have identification marks for their animals, provides for prescription of identification marks, applications for their registration, prohibited marking of animals and registration of marking operators.

2.2.5 Animal Welfare Act (Act No.72 of 1962)

When an animal cruelty case is investigated it should be kept in mind that cruelty to animals is defined as is the human infliction of suffering or harm upon non-human animals, for purposes other than self-defense or survival in terms of this act (South African Veterinary Foundation n.d.). Therefore, evidence must be collected which implicates the suspect or accused in contravening this act in terms of cruelty. This evidence can include confiscating the animal by following prescribed procedures. The following aspects are covered in the Act: any person intending to exhibit or train for exhibition any animal, or who uses a dog for safeguarding, may apply in writing in the prescribed form to the magistrate of the district in which such person resides, performs or carries on business, for a license to do this;

No person shall exhibit or train or cause or permit to be exhibited or trained for exhibition any animal of which he is the owner or has the lawful custody or use any dog for safeguarding unless such person is the holder of a license as stipulated by animal welfare Act;

A veterinarian should examine the animal and provide a comprehensive report detailing any physical abuse, withholding of food and water, and take photographs showing that housing was inadequate or the animal was constrained in a cruel and inhumane manner (South African Veterinary Foundation n.d.).

2.3 Evidence Collection

During the collecting of evidence from a crime scene, the Crime Scene Investigator (CSI) has several main goals in mind: Reconstructing the crime, identifying and link the perpetrator, preserving the evidence for analysis and collecting it in a way that will make it stand up in court.

2.3.1 Management of crime scenes

Management of a crime scene is the process of ensuring the orderly, accurate and effective collection and preservation of physical evidence so that the evidence can be used to take legal action. Further scientific analysis of evidence may become the responsibility of the forensic laboratory.

2.3.2 Role of Local Criminal Record Centre member

Local Criminal Record Centre (LCRC) members are responsible for collecting evidence from a crime scene, ranging from taking photographs to removing spent cartridges or samples of bodily fluids left at a scene, with members working on the simple rule that 'all evidence must first be documented before it can be removed' (SAPS 2015).

Crime scene investigators help to establish what happened (crime scene reconstruction) and to identify the responsible person by carefully documenting the conditions at a crime scene and recognizing all relevant physical evidence. This evidence can include, but is not limited to, fingerprints, photography, plan drawing, videography and ballistics. The crime scene investigator is also involved in the processing of crime scenes where poaching of wild animals or theft of livestock took place.

Training is needed for all the crime scene investigators involved in investigation of specific types of crime, including animal crime scenes regarding proper procedure for collecting, transporting and storing exhibits. The successful use of the forensic evidence in combating poaching and stock theft relies heavily on the chain of custody of forensic samples.
The crime scene investigator can collect clothing from the perpetrator and anyone who may have been at the scene to test for suspected animal DNA found on their belongings. Tools, weapons, (Merck, Miller & Maiorka 2013), gun shot-residue can be collected and sent to the Primer Residue at Scientific Analysis of the Forensic Science Laboratory in Silverton, Pretoria, for further analysis. Body fluids found at a crime scene might include blood, saliva, or intestinal fluid. To identify and collect these pieces of evidence, a crime scene investigator might use smear slides, a scalpel, tweezers, scissors, sterile cloth squares, swabs, a UV light, protective eyewear and Blue Star Latent Blood Stain Reagent (Bluestar n.d.). A blood collection kit and buccal swabs can be used to collect samples from suspects. Samples collected for DNA analysis such as animal blood, skin, hairs are sent to Animal Genetics Laboratory of the Agricultural Research Centre Animal Production Institute located in Irene Pretoria. All rhino related DNA

cases are sent to of the Rhino DNA Index System (eRhODIS) of the University of Pretoria, Veterinary Genetics Laboratory (eRhODIS.org n.d.).

2.3.3 Role of the Forensic Science Laboratory of the SAPS and private forensic laboratories dealing in specific services

Their aim of these laboratories is to police crimes against wildlife, such as poaching of animals on land as well as in the water. The scientific identification of a species is an important service that is provided for wildlife investigations.

A perpetrator might leave prints on porous or nonporous surfaces. Paper, unfinished wood and cardboard are porous surfaces that will hold a print, and glass, plastic and metal are non-porous surfaces. A crime scene investigator will typically look for latent prints on surfaces the perpetrator is likely to have touched. Crime scene investigators might only collect the objects at the scene and then submit it to the laboratory for processing if special techniques are required for processing that might not be practical on a crime scene such as recovering touch DNA from the surfaces. During animal crime scene investigations, many possible exhibits are left behind, namely, fibers, footwear impressions, glass, paint, hair, weapons, bullets, documents and DNA. Many of these can be used in DNA analysis at the laboratories.

2.3.4 Role of dogs at crime scenes

Dogs play an important role in investigations with their keen sense of smell being harnessed to aid in finding perpetrators, drugs and illegal items such as animal parts. Dogs also detect explosives and bodies at the crime scenes. Arson dogs are trained to detect the chemical traces of accelerants. Cadaver dogs are trained to follow the scent of decomposing flesh in order to locate the bodies of deceased human beings and animals (Stejskal 2013).

2.3.5 Role of a dog master in South Africa

The dog master is a member of the South African Police Service who is trained to serve as a dog handler. In order for the SAPS dogs (policing aids) to function within their different fields of expertise, the dog handler leads as his or her dog master. They lift and check tracks for comparison purposes. They are responsible to make plaster casts of the shoe prints from the scene (SAPS,2015).

2.4 Stock Theft

2.4.1 Stock theft in South Africa specifically the Thabazimbi area in the Limpopo province

Currently in Limpopo Province, there are eight stock theft units with 101 members that are working under stock theft. All 101 members are trained stock theft investigators. According to research on the extent of stock theft in South Africa, 31.8% of stock theft cases are not reported due to lack of trust in the capability of the SAPS to recover stolen stock and or to prosecute the case successfully (Clack, 2013). Anderson (1986) explains that stock theft is not viewed as a crime in some African communities and states "that the refusal of African public to help in the prevention and detection of stock theft can be seen as their acceptance of this crime as part of their culture in African communities."

2.4.2 Training of stock theft investigators in South Africa

Stock theft investigators are trained in basic criminal investigation and also in the following: Information System of Identification of Suspects (ISIS); Criminal Administration System (CAS) and a circulation course. The circulation course is used to identify the branding marks on animals. In order to prove ownership, animals must be clearly and positively identified. Animal identification consists of various methods including physical markings such as hot branding, freeze branding or tattooing. Microchipping and DNA profiling provide positive methods of identification. Stock theft investigators are also trained to identify various characteristics of the carcass that can assist with the investigation. Regular courses are presented to members of the stock theft unit by the Forensic Science Laboratory.

2.4.3 Role of Stock theft investigators

Stock theft investigators are responsible for the investigation of crimes related to the theft of stock, endangered species, poultry (only big quantities) and related enquiries. The investigator visits stock auctions, farms, butcheries, abattoirs, hide dealers, stock pounds and speculators. Many animal stock theft cases are often reported at these venues (Department of Community Safety and Liaison n.d.).

2.4.4 Duration of stock theft training

To be declared competent on stock theft training, the following courses have to be completed: Stock Theft Act course; Animal Identification Act course; Animal Protection Act course; Meat Safety Act course and the Animal Diseases Act course. The training period for stock theft is four weeks.

2.5 Poaching in South Africa

Poaching refers to the illegal practice of trespassing on another's property to hunt or steal game without the landowner's permission (Dictionary.com n.d.).

There are two different types of poachers: subsistence poachers and professional poachers. Subsistence poachers are usually those coming from poor communities driven by hunger and poverty – they usually poach smaller game. Professional poachers are highly organized and very well-funded. Local and Asian syndicates use well-structured operations and sophisticated methods such as veterinary drugs, helicopters, night vision equipment, and high calibre weapons. Rhinoceros poaching is now classified as a priority crime and is driven by organized crime syndicates as a result of the value of the horn.

In Thabazimbi during the course of this study, sophisticated methods were used in some of the cases in which rhino horns where removed. High calibre weapons were confiscated, however the use of helicopters to commit such offense has not been reported during the course of this retrospective study for the period 2013-2015.

The method to retrieve DNA from rhinoceros horn has been very successful and it can be done from less than 0,1 mg of horn (Harper, Vermeulen, Clarke, de Wet & Guthrie 2013). This provides the DNA evidence needed to link poachers back to the scene of the crime using the Rhinoceros DNA Index System (RhODIS®) database that contains DNA profiles and samples of African rhinoceros from South Africa and other African countries (De Bruin 2014).

In order to ensure harsh sentences for these criminals, it is important to charge them with every possible crime such as trespassing, possession of unlicensed firearms and ammunition (hunting or automated rifles), possession and distribution of scheduled veterinary drugs (in those cases using darts with tranquilliser drugs), illegal hunting or poaching, and illegal possession of rhinoceros horns.

2.5.1 Rhinoceros DNA Index System (RhODIS®)

RhODIS® was initiated by the Veterinary Genetics Laboratory of the University of Pretoria in order to match recovered horn to individual rhinoceros and poached rhinoceros and to link poachers, traffickers and horn from consumer countries. The Veterinary Genetics Laboratory receives DNA samples of rhinoceros across South Africa and the rest of the world to create a database using the unique DNA profile of individual rhinoceros. The objective is for all rhinoceros to be on the system. This is tremendously important for prosecuting rhinoceros related cases by linking recovered horns and tools to rhinoceros' carcasses, placing the poacher or trafficker on the scene of the crime.

The South African Department of Environmental Affairs introduced amendments to the norms and standards for sample collection and identification of live and poached rhinos under the National Environmental Management: Biodiversity Act 10 of 2004, which requires that samples are collected from all poached rhinoceros and other rhinoceros that are immobilized or die using RhODIS® kits which then have to be submitted to the Veterinary Genetics Laboratory for inclusion on the RhODIS® database (eRhODIS.org. n.d.).

The current database consists of DNA samples of more than 30 000 individual rhinocerosses and is kept by the Veterinary Genetics Laboratory at Onderstepoort. This database is updated regularly with the addition of new samples (personal communication Harper, 2015).

2.5.2 Poaching in Thabazimbi

The Organised Crime Unit in Polokwane investigates rhinoceros poaching cases. Environmental Management Inspectors (EMI) of the Department of Environment Affairs investigates the rhinoceros poaching crime scenes since they are trained to deal with these.
A total of 15 cases were reported in the Thabazimbi area between January and December 2013 of which eight where rhinoceros poaching cases and the other seven were believed to be natural deaths and not due to poaching because the horns were still on the carcass. All eight have been successfully prosecuted. In one case, the perpetrators pleaded guilty to illegal buying, possessing and conveying of 30 rhino horns. In another case the perpetrators were sentenced to ten years imprisonment of which two years were suspended for five years. Another suspect was sentenced to four years imprisonment wholly suspended as well as repayment of R100, 000.00 per month for the next 10 months to assist in rhino research. Three poachers also received hefty sentences in the Cumberland area during February 2013. They pleaded guilty

during their last appearance in the Thabazimbi Magistrates' Court on the charges of the illegal possession of a fire-arm and the conspiracy to commit rhino poaching (Thabazimbi SAPS MIC office).

2.6 International Wildlife Trafficking

Wildlife trafficking contributes to the spread of virulent wildlife diseases, such as avian influenza and severe acute respiratory syndrome (SARS) (Nijman, 2010). Various governments, organizations and people around the world are required to combat this dangerous threat. The Convention on the International Trade in Endangered Species of Wild Fauna and Flora (CITES) is an international agreement between 183 countries (known as parties) and its aim is to monitor and manage the international trade in endangered species between countries. Problems of poaching include the depletion in the number of wildlife present in a given area, the reduction in numbers of breeding animals and thinning the gene pool. Poaching also affects ecosystems (International Anti-Poaching Foundation.com, n.d.).

Over the past several years, the U.S. Department of State has contributed over $2 million to combat this illegal trade, funding activities such as enforcement and judicial training in Southeast Asia, species protection in Latin America, and enforcement workshops in South Asia (Nijman, 2010).

2.6.1 International animal crime

Conservation research suggests that much wildlife crime is committed as a normal response to local conditions. This is particularly the case in developing countries, where first level crimes such as killing, trapping, persecuting and poaching animals, are often committed by subsistence offenders as animals are seen as either food sources or as threats to for instance crops (Bulte & Rondeau, 2007).

There has been concern that sanctions for wildlife trade crimes do not reflect how serious such crimes are in terms of the potential illegal profit (House of Commons 2004; Chaber et al. 2010), the threat status of the species involved, or the level of loss to society (Eagle & Betters 1998).

2.6.2 International animal crime scene investigation methods.

Harihar (2009) used intensive research to monitor the tiger population in South Asia. He noticed that capture–recapture-based camera trapping is increasingly being used by researchers for estimating the abundance of tigers in South Asia (Karanth 1995; Azlan & Sharma 2003; O'Brien et al. 2003; Kawanishi & Sunquist 2004; Wegge, Pokheral & Jnawali 2004; Simcharoen et al. 2007; Pandav & Goyal 2009). However Cole Burton (2012) indicated that effective monitoring programs are required to understand and mitigate biodiversity declines, particularly in tropical ecosystems where conservation conflicts are severe, yet ecological data are scarce. Cole Burton (2012) further highlighted that careful attention to monitoring objectives, methodological design and robust analysis are required if locally-based approaches are to satisfy an aim of reliable biodiversity monitoring, and there is a need for greater international support in the creation and maintenance of local monitoring capacity.

Wildlife crime legislation in England and Wales is enforced by the regional police services. Most authorities claim that wildlife crime, particularly CITES-related offences such as illicit trade in endangered species, is big business. The global legal trade in flora and fauna, which includes timber and fisheries, was estimated at around US$159 billion in the 1990s by (Cowdrey 2002).

According to Cooper and Cooper (2013), animals that are commonly targeted include birds, reptiles, insects, fish and large game animals. Rare or endangered species are particularly targeted by collectors, or for the pet trade.

International organizations, including Interpol and World Wildlife Fund (WWF), have made attempts to define the scale of the international illegal wildlife trade. However, there are many difficulties with this task and the resulting estimates cover an extremely broad range from 25%-70% of the legal trade (Nijman, 2010).

TRAFFIC International, a joint programme of WWF and International Union for Conservation of Nature (IUCN), which monitors the trade in wildlife, has suggested that the value of the illegal trade based on declared import figures from the early 1990s (excluding timber and fisheries) could range from £2.25 billion to £6.3 billion. However, the covert nature of

smuggling and difficulties in detecting illegal shipments mean it is not possible to provide a reliable estimate of the scale of these illegal activities with some estimates as high as US $10 billion or more (Mawdsley, O'Malley & Ojima 2009).

According to the International Union for Conservation of Nature, the current rate of species extinction is 1000 times more than the expected natural rate. This dramatic decline relies on numerous causes, but it is noteworthy that the loss of biodiversity has been dramatically influenced by human activities (Yoccoz, Nichols & Boulinier 2001).

2.7 Animal abuse

According to Black's Law Dictionary, cruelty to animals is defined as the infliction of physical pain, suffering or death upon an animal, when not necessary for purposes of training or discipline or, in the case of death, to procure food or to release the animal from incurable suffering, but done wantonly, for mere sport, for the indulgence of a cruel and vindictive temper, or with reckless indifference to its pain (thelawdictionary.org n.d.). Cases of animal cruelty and abuse are prosecuted under the Animal Welfare Act.

2.8 Factors to consider in the investigation of animal crime scenes

2.8.1 Chain of Custody

Any evidence related to a crime must follow a chain of custody. This refers to a recording process where the evidence is accounted for at all times. 'Evidence' is anything collected at the scene of the crime, from the animal, all samples, all photographs taken, the photo card or negatives, and the animal itself. All evidence must be labelled with date and time, a description of the item and the person who collected it should initial or sign across the seal. An evidence log must be maintained showing the same information and the location where the item is kept. All evidence should be kept in a locked cabinet with restricted access. If the evidence is transferred to another person, location or laboratory, this must be noted with time and date, the purpose of the transfer, and a signature obtained from the recipient (Lirieka Meintjies-Van der Walt, 2011).

The SAP 13 Register is used to record illegal firearms. Guns that are seized from unlicensed owners and those collected from animal crime scenes, used to commit crimes and those stolen and recovered, are kept in the SAP 13 Register. They are first booked in and booked out back

to the Local Criminal Record centre to be packaged and forwarded to Forensic Science Laboratory in Pretoria. Exhibits presented as evidence in court by the investigating officer, must have information on who received it, when it went for ballistic examination and when it was returned to the station. If the paper trail is not in order, the exhibit cannot be admissible as evidence.

The SAP 13 Register is the direct responsibility of the station commander. He or she must have a proper record of all items in the exhibit room. A chain of custody is vital, especially for exhibits that are used in court. The police standing orders are very clear on the SAP 13 Register. All guns must be kept in a gun safe. The station commanders have the responsibility of inspecting the SAP 13 Register every month.

2.8.2 Animals involved in crimes scenes

The animal is part of the crime scene and as such should be handled appropriately. The animal should be transported by an officer to the veterinarian in order to preserve the chain of custody. If the animal is deceased and the body must be held prior to transfer to a veterinarian, it must be placed in a cooler but not frozen. Freezing damages all the tissue which ruins pathology. In cases where the animal is too large, such as in rhinoceros poaching cases, a post mortem is performed at the crime scene (Problemofpoaching.com.n.d.).

A pathologist works simultaneously with an investigating officer during the autopsy. A pathologist uses the J88 form when assessing the body. A statement is then handed to the SAPS which is then placed in the investigating officer's docket ready for court. The duties of the veterinarian and pathologist are similar. A veterinarian can also appear in court and present his or her finding.

2.8.3 Types of forensic evidence

The following list contains the items that count as evidence:

- Body fluids and faecal material.
- Blood.
- Saliva from bite mark.
- Hands and fingernails.
- Hair and wool.

- Cigarette butts.
- Chewing gum.
- Envelopes and stamps.
- Items in garbage.
- Gloves and face masks.
- Firearm and cartridges.
- Samples for DNA analysis.
- Photographs.
- Cell phone records.
- Video material.
- Toxins.
- Documents including permits.

Trained investigating officers or Local Criminal Record centre technicians can collect evidence on the scene of crime and process it accordingly. Environmemtal Mangement Inspector's from the Department of Environmental Affairs are also trained to investigate and collect evidence from wildlife crime scenes. A firearm must first be booked in and out at the SAPS station near the place where the scene occurred. The LCRC member will then process it with relevant statements to a Forensic Science Laboratory (FSL) ballistics unit for further investigation. Other exhibitions such as plastics and boxes that were collected at the scenes are sent to fingerprint laboratories within the LCRC environment for investigation.

LCRC members bring the scene reports to collect information and the same applies to the EMI from Department of Environmental Affairs. Information can be collected with the use of digital camera photography, GPS coordinates, sketch plans and videography. The photographs and videos will then be stored in the archives or CD's and later used to compile the case docket and photo album which will be used in the court of law.

2.8.4 Evidence Collection Kit

The Forensic Science Laboratory recognised the need for the development of evidence collection kits for the use of members of the South African Police Service. The Animal DNA Evidence Collection Kit (AEC: ICN code 6650T05039078) must be used for the collection of animal DNA samples as well swabs from items and surfaces (SAPS 2015). The SAPS have recently introduced their own sample collection kits intended for use in animal crime scenes (Vermeulen, personal communication, 2015).

2.8.5 Footwear Impressions and Tool Marks

A latent fingerprint is an example of a two-dimensional impression. A footwear impression in mud or a tool mark on a window frame is an example of a three-dimensional impression. Tool mark is an impression left by the contact of a tool onto a surface. Tool mark help to establish a link between a tool mark and the tool that created it.

In the application, it is important to distinguish between the different evidence collection kits, as each has a specific purpose. It is necessary that the evidence collection kit is used for the purpose it was designed for. The D1 crime kit, for example, must only be used for the collection of biological evidence material of an adult victim either human or animal.RhODIS DNA sample collection kits are provided by the Veterinary Genetics Laboratory specifically for the purpose of collecting rhinoceros samples from rhinoceros poaching incidents.

CHAPTER 3: METHODOLOGY

3.1 Research Ethics

Information collected during this research is confidential. The research will not interfere with the process of South African Police Service investigations or of the court of law or other investigating officers responsible for the cases**.** Permission was obtained for the study from the relevant authorities prior to commencement of the study. The permission letter is included as Addendum 1 to the thesis.

3.2 Description of the study area

This study was primarily done in the Thabazimbi Municipality which falls under the Waterberg District Municipal area of the Limpopo Province of South Africa. The size of the municipal area is 986 264, 85 ha. The research was extended to other surrounding areas within the Thabazimbi Municipality including Northam, Rooiberg, Cumberland, Dwaalboom, Hoopdal and Koedoeskop.

The indigenous people in this area are Tswana speaking people as well as people from other tribes such as Xhosa, Tsonga and Venda. Most of the inhabitants came to the area looking for job opportunities in mines around the area (Van Vollenhoven, 2013). Maps of the district are included as Figures 1 and 2.

The following maps depict the areas in which the research was conducted:

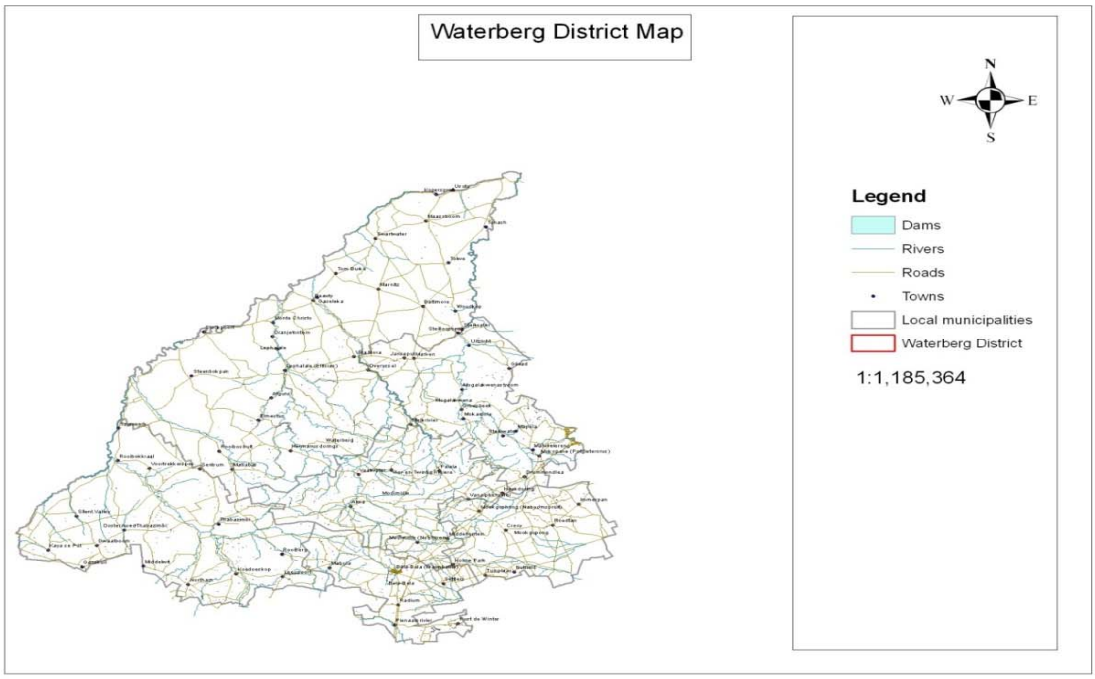

Figure 1. Map of all the Waterberg areas in South Africa.

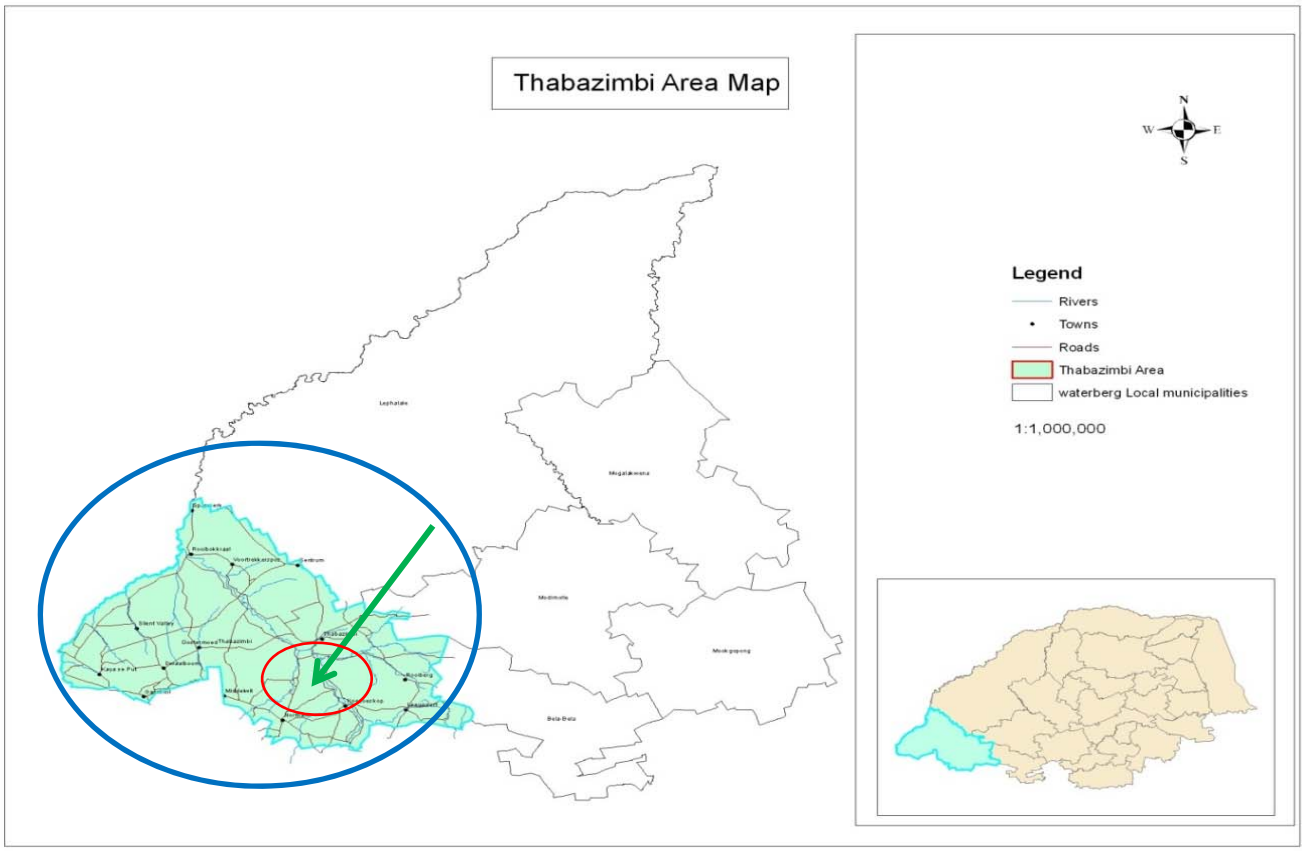

Figure 2. Map of the area where research was conducted within the Thabazimbi Municipality (the small circle indicates the main town and the big circle and shaded areas show the surrounding areas).

Thabazimbi has nine commercial livestock farms, namely Klipfontein KQ 429, Klipvlei KP5, Kammelfontein KQ 4, Kromkodeldrieft KP81, Groenrivier, Bloemhof KP 201, Holland KP66, Hanover Nooitgedacht and Stellenbosch KQ. These farms have both livestock such as cattle, goats, and chickens and also game farm animals such as springbok, Nyala and others.

There are a number of protected areas within the Waterberg District, including Marakele National Park, Entabeni Nature Reserve, D'nyala Nature Reserve and Doorndraai Dam Nature (Waterberg District Municipality n.d.).

Table 1. The number of cases from each police station included in this study.

Police stations	Number of cases reported
Thabazimbi	20
Northam	14
Cumberland	07
Dwaalboom	11
Rooiberg	08
Mogwase	04
Hoopdal	07
Total number of cases	71

3.3 Research Type

The study is descriptive and retrospective with all information previously collected. Descriptive research includes both quantitative and qualitative data and uses these types of data to describe the population being observed. For example, someone interested in why certain groups of trees are dying, while others of the same type and in the same location are thriving, can observe the trees and their surrounding environment to come to a preliminary decision. At its core, this is descriptive research (Reference.com n.d.).

A retrospective study looks backwards and examines exposures to suspected risk or protection factors in relation to an outcome that is established at the start of the study. For example, cases of stock theft in Thabazimbi since 2013 (Statsdirect.com.n.d.).

3.4 Data collection methods

. The Local Criminal Record Centre crime scene reports were used to gather information in the field and the information was saved on a spreadsheet in Excel and a summary of each case was written on a pre-defined case report template. A spreadsheet was designed to collect information about animal crime scenes based on various crime scene sampling procedures and processes. The spreadsheet was completed in order to analyse the results and for statistical evaluation of the data. The Case Adminstration System (CAS) system was checked regularly for reported cases using the CAS number and the case information and outcomes were updated. The history of the crime scene was investigated in every scene attended and included in the case description. Crime scene investigation performed was evaluated to the requirements in the relevant acts and the training and CSM process. Deviations and omissions were identified.

3.4.1. Sampling methods

Purposive sampling is selecting a sample "on the basis of your own knowledge of the population, its elements, and the nature of your research aims" (Babbie, 1990, p.97). The individual characteristics are selected to answer necessary questions about a "certain matter or product" (McNealy, 1999, p. 157).

For example, if a researcher wants to know student thoughts on using an online registration system, those students who attempt to use the system would be surveyed. If this survey took place at one institution, the results could not be generalized to every institution utilizing web registration, only the institution where the survey took place.

Crime Scene Management process flow was utilized to guide the collection of data for the various parts of the crime scene investigation process as illustrated in Figure 3, below.

Figure 3. The Crime Scene Management process displays the various stages in sampling, processing and prosecution.

3.4.2. Variables

The variables in the data collection spreadsheet are described below:

- **Photograph** refers to an image captured using a camera, in which an image is focused on to light-sensitive material and then made visible and permanent by chemical treatment, or stored digitally.
- **Photography report**: a report that is issued by a crime scene investigator to the investigating officer or detective in the form of photo album and statements.

- **Fingerprints** are an impression of the friction ridges of all or any part of the finger. A friction ridge is a raised portion of the epidermis on the palmar (palm and fingers) or plantar (sole and toes) skin, consisting of one or more connected ridge units of friction ridge skin.
- **Shoe prints:** a visible print is a transfer of material from the shoe or tyre to the surface. This type can be seen by the naked eye without additional aids.
- **Forensic footwear evidence** can be used in legal proceedings to help prove that a shoe was at a crime scene. Footwear evidence was often the most abundant form of evidence at a crime scene and in some cases can prove to be as specific as a fingerprint.
- **Micro-fibre evidence** is synthetic fiber finer than one denier or decitex/thread.
- **Facial recognition**: a facial recognition system is a computer application for automatically identifying or verifying a person from a digital image or a video frame from a video source.
- **Ballistics and ballistics report** is the science of mechanics that deals with the launching, flight, behaviour, and effects of projectiles, especially bullets, gravity bombs, rockets, or the like and includes the matching of the ridges on the bullet to a specific weapon. It is the science or art of designing and accelerating projectiles so as to achieve a desired performance. When a gun is fired, the gunshot residue particles, small particles produced during the gunpowder explosions, are emitted from the back of the weapon and the muzzle. These particles fly onto the skin and clothing of the person holding the gun.
- **DNA samples** are a collection of cells from a body. The type of samples can vary from hair, blood, saliva, tissue, bone, horn and swabs.
- **Deoxyribonucleic Acid (DNA)**: a self-replicating material which is present in all living organisms in the form of chromosomes. It is the carrier of genetic information and can be used to identify an individual animal or species of animal.
- **Fingerprints laboratory exhibits** are exhibits which are collected from the field and processed in the laboratory through various chemical investigation processes with the objective of obtaining a fingerprint.
- **Toxicology /chemistry report**: is the result of the laboratory procedures identifying and quantifying potential toxins, which include prescription medications and drugs of abuse and interpretations of the findings.
- **Pathology report**: is a document that contains the diagnosis determined by examining a body macroscopically as well as examining specific cells and tissues under a microscope. The report may also contain information about the size, shape, and macroscopic appearance of a specimen, wounds and trauma.

- **Post mortem** an examination of a dead body to determine the cause of death.
- **Hair Fibre**: Micro spectrophotometers are used to analyse pigments, dyes and substrate materials of textile fibres and hairs are used for species identification and DNA.
- **Light sources** is a crime scene investigator's and lab technician's tool for enhancing observation, photography and collection of evidence including latent fingerprints, body fluids, hair and fibers, bruises, bite marks, wound patterns, shoe and foot imprints, gunshot residues, and drug traces.
- **Gloves** used as a covering for the hand worn to prevent contamination.
- **Statements taken**: They are statements which are taken during crime scene investigations either the investigating officer or the crime scene investigators who are the first members on the scene.
- **Indication of transplantation**: an authentic signature utilized in a photocopy forgery.
- **Indication of forgery of prints**: the action of forging a copy or imitation of a document, signature, banknote, or work of art.
- **Loose objects found**: This refers to small objects which might have been left by the perpetrators on a crime scene.
- **Person indicating points warned according to judges rules**: The rights which are read to the witness or any person giving evidence or information that can later be used in the court of law against someone who might have acted unlawfully.
- **Suspects pointed out:** When the suspects were identified during the crime scene investigation either by the community, witnesses or investigating officers.
- **GPS coordinates taken:** GPS is a satellite-based navigation system which indicates where an event took place.
- **Video taken**: Video material taken of the crime scene.
- **Accused charged in court:** The results of the case.

All information related to arrests, prosecutions and convictions of all cases visited and attended where recorded on the spread sheet. The following numbers were used in all the above mentioned activities, one **(1)** to indicate that the mentioned activity was conducted and zero **(0)** to show that the mentioned activity was not performed during the investigation of the case.

3.5 Data analysis

The data were categorised into two sets consisting of variables which explained the crime scene sampling procedure and those that represented internal procedures such as laboratory reports that influenced the outcome of the case. The variables that are commonly used in crime scene sampling are photographs taken, fingerprints taken, shoe prints taken, DNA taken, light sources used, gloves used, statements taken, suspects pointed out, fire-arm used and fingerprint laboratory exhibits collected. Those that represent the internal procedures that influence case prosecution are DNA reports provided, ballistics report provided, fingerprint positive or negative, photography report provided, toxicology or chemistry report provided, pathology report provided, laboratory photographs printed, and fingerprint result captured on CAS, were all internal procedures. Inferential statistics were used to test the relationship between case outcome and the crime scene sampling process, as well as the submission of crime scene materials for case prosecution. Chi-square for association was used to ascertain the association between each of the crime scene sampling methods and the outcomes of the case, as well as the association between the submissions of crime scene materials for case prosecution with the outcome of the case. This test calculates the association between categorical variables with more than one level using frequency distribution and ranks. The test statistics include Chi-Square, and the Phi and Cramer's V values which give an indication of the strength of the association between the variables. If there is a higher frequency of categories that are related, the association tends to be significant with a strong effect. This means that the relationship between the variables is highly interdependent (Pallant 2007).

To determine which variables from the crime scene procedures, and which from the internal procedure, significantly predict the outcome, a Multinomial Logistic Regression Analysis was used. The logistic regression is a linear model in the Generalized Linear Model family, used to determine the relationships among categorical predictors and categorical response variables (Pallant 2007). The response variable was case outcome with four levels: Guilty; Withdrawn; No arrest; and Pending. The Guilty variable was used as a reference category to which the outcome of the model was compared. The predictors for the model were determined after the Chi-square test for association. The model was only run on cases where the suspect appeared in court and cases in which DNA was taken but no report was handed in. Descriptive statistics of the distribution of the data are shown graphically. All analyses were conducted in IBM SPPS 23.0. Statistical significance was accepted at $p<0.05$.

CHAPTER 4: RESULTS

Crime scene sampling methods include various standard procedures and processes. The commonly conducted crime scene procedures occurred in almost all the animal crime scenes investigated in this study (71 cases). Gloves were used and photographs and statements were taken in 100% of cases investigated in this study. The rest of the procedures only occurred in a small percentage of the cases (<20%). Despite their relative importance to the outcome of the case, fingerprints and DNA evidence were poorly utilised in all the cases as illustrated in Figure 4.

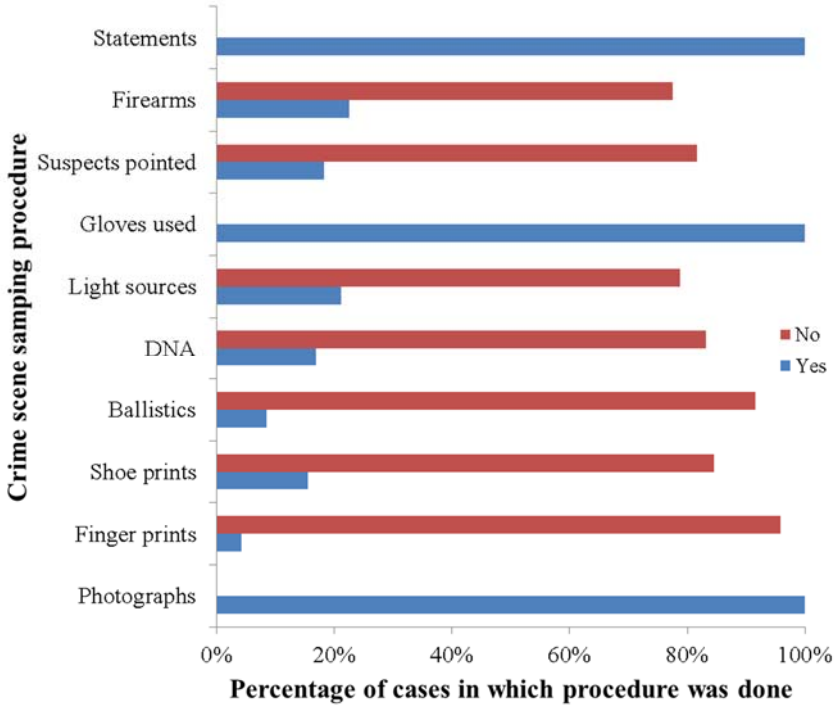

Figure 4. Bar graph showing the percentage (%) of cases in which crime scene sampling procedures were conducted.

The percentage of cases in which internal procedures were utilised in prosecutions is illustrated in Figure 5.

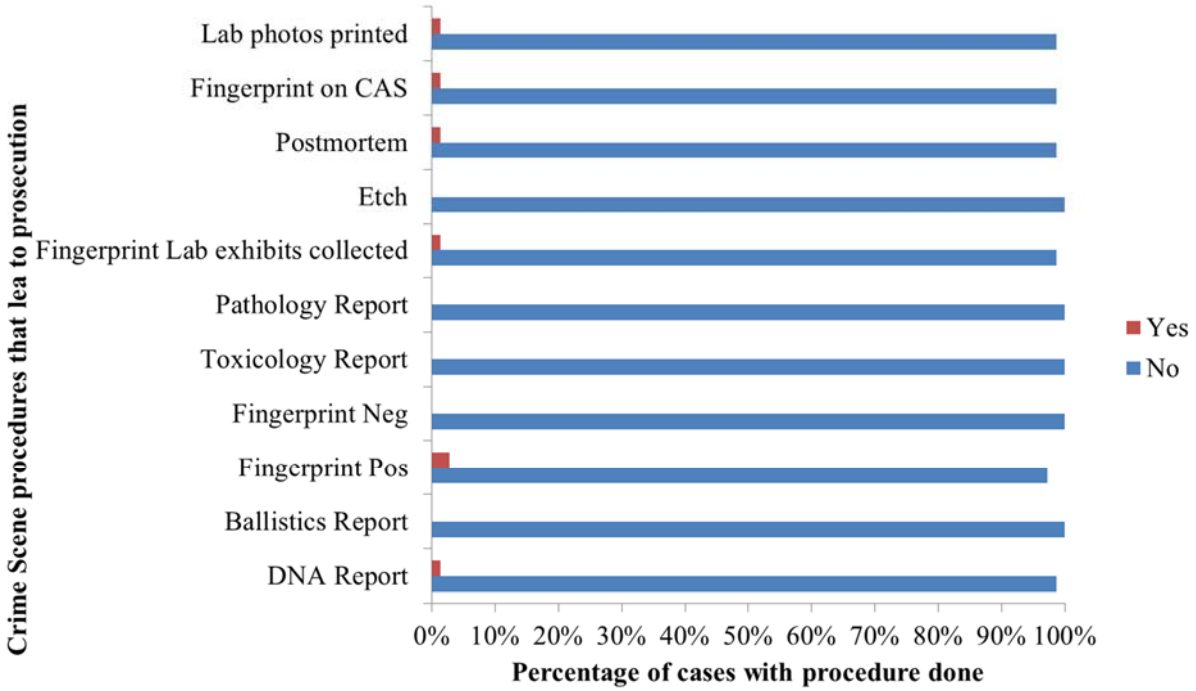

Figure 5. Percentage of cases in which internal procedures were utilised in prosecutions. Less than 1% of procedures were adequately processed for use in prosecutions.

Figure 6 below depicts outcome for cases in the different police stations in Thabazimbi.

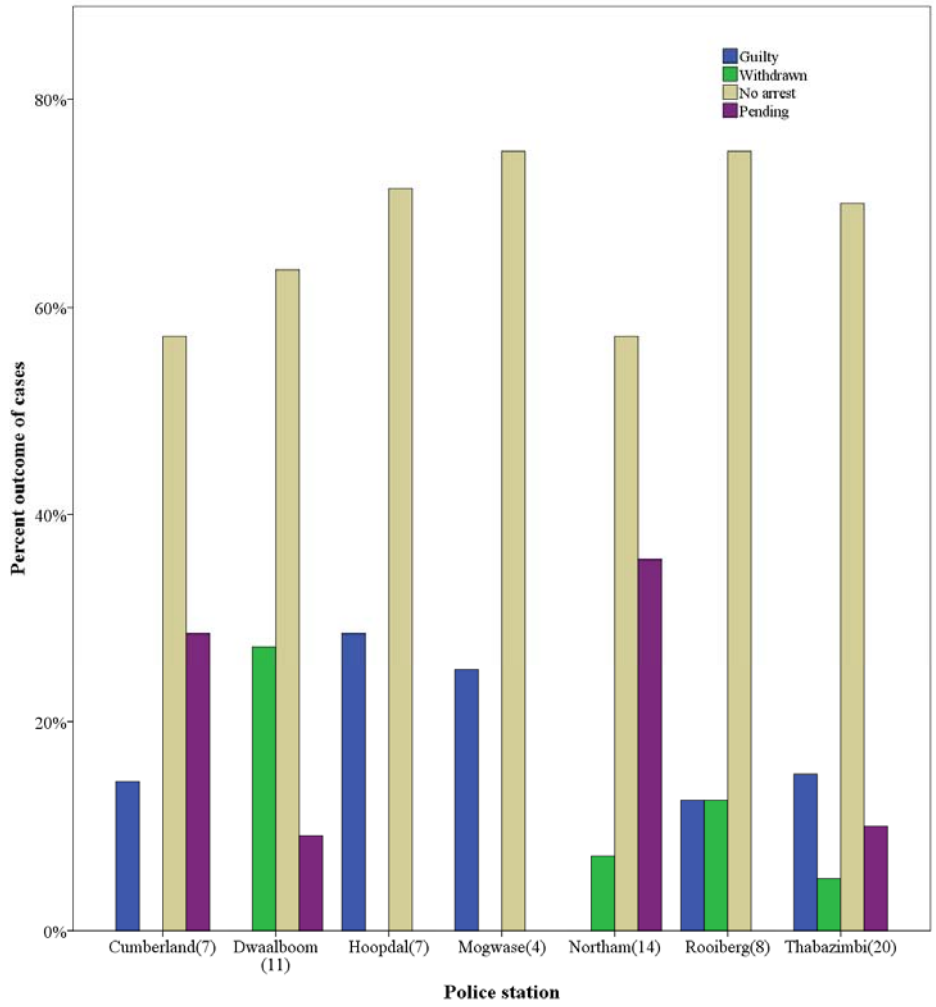

Figure 6. Percentage outcome for cases in the different police stations in the study area of Thabazimbi. (The number of animal crime cases investigated per police station during the study period is given in brackets).

The percentage of cases in which arrested suspects were charged or appeared in court is illustrated in Figure 7, below.

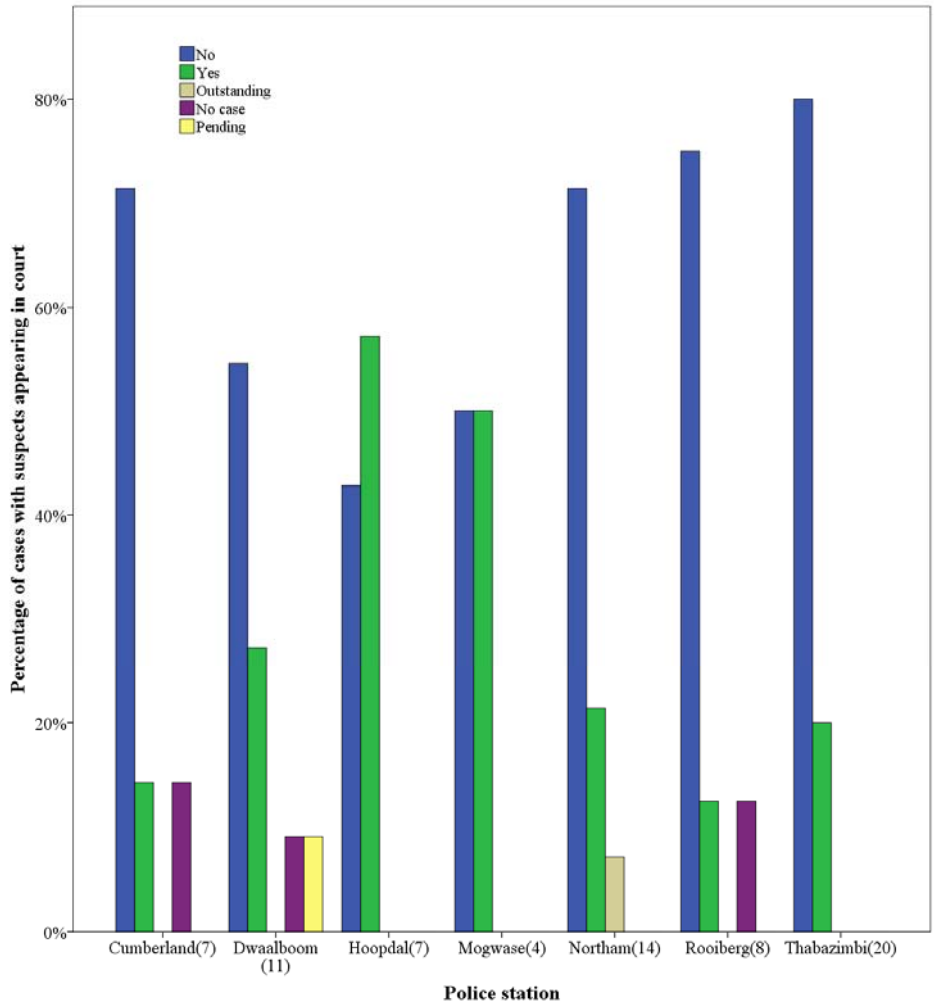

Figure 7. The percentage of cases in which arrested suspects were charged or appeared in court. (The number of animal crime cases investigated per police station during the study period is given in brackets).

Figure 8 below shows the association between the percentage of case outcome and whether the suspect was identified by a witness.

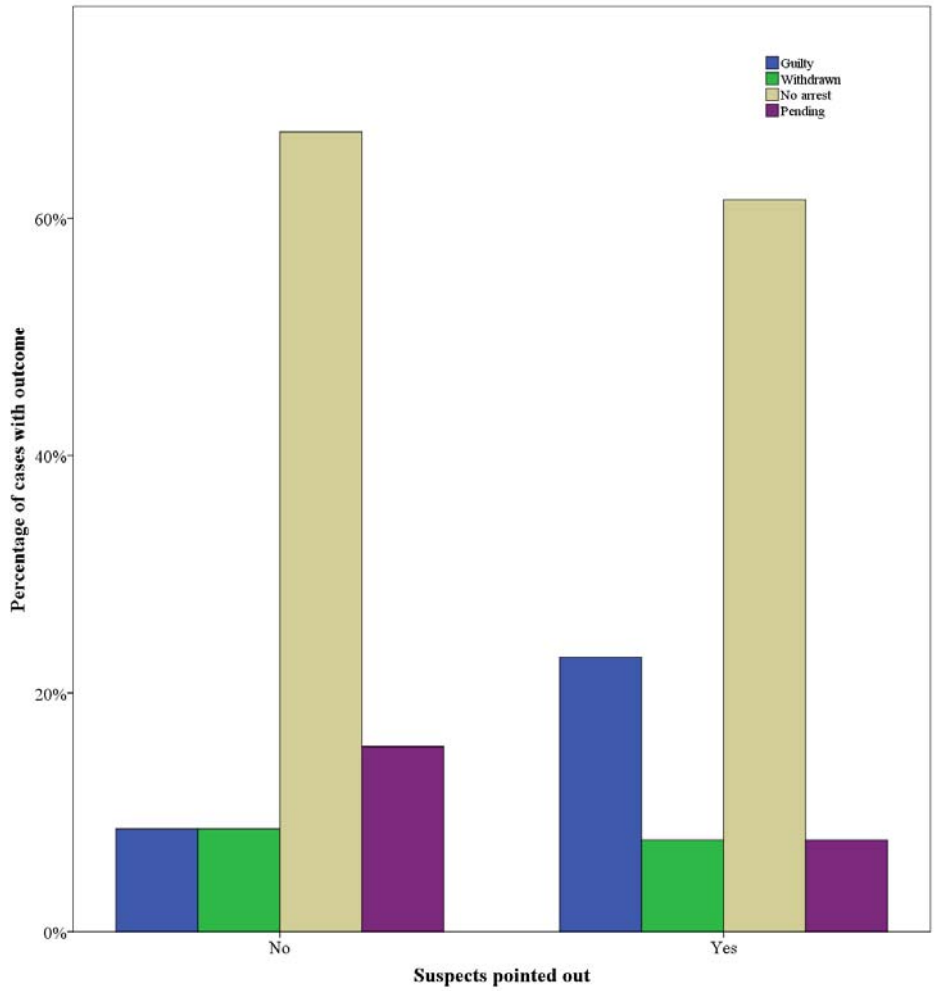

Figure 8. The association between the percentage of case outcome and whether or not the suspect was pointed out (suspect identified by a witness).

Inferential statistics were used to test the relationship between successful case outcome and the crime scene sampling procedure as well as internal procedures used for prosecution. Due to the high numbers of zeros in the data (Supplementary Table 1), these variables were excluded from the Chi-square and the Multinomial Logistic Regression Analysis. In addition, the Chi-square and the multinomial logistic regression do not compute variables in which there are constants i.e. 1s or 0s only in each variable. These variables are thus excluded in the analysis. The analysis was conducted on the first level including all cases, and on the second level including only cases in which suspects were charged or appeared in court. The variables excluded on the first

analysis for the whole data set and on the second analysis for only those who appeared in court are: gloves used, statements taken, microfibre, facial and light sources.

The Chi-square analysis of association between crime scene procedures and outcome indicated that there is a significant association between the suspect appearing in court and a guilty verdict ($p < 0.05$) as illustrated in Table 3. There is a higher likelihood of a guilty verdict if the suspect appears in court relative to the cases being withdrawn or pending. The other crime scene procedures did not show any significant association with case outcome (see Table 3).

Table 2. The results of Chi-Square test of association, testing the relationship between case outcome and the crime sampling scene procedure (χ2 chi-square, DF degrees of freedom, p probability of deviation).

Effect	**χ^2**	**Df**	**p**
Accused appeared/charged in Court	25.66	12	0.01
Fingerprint taken	1.44	3	0.69
Ballistics taken	0.14	3	0.71
Shoeprints taken	3.35	3	0.34
DNA taken	2.95	3	0.39
Suspect pointed out	2.49	3	0.48
Firearm used	5.94	3	0.12

The results of the Multinomial Logistic Regression Model showed that the predictors used in the model had a significant influence on the variation in case outcome ($\chi^2 = 44.35$ df = 30p < 0.05, explaining 46% of the variance). However, only the variable associated with the suspect appearing in court significantly predicted the case outcome ($\chi^2 = 22.27$ df = 12 $p < 0.05$, Table 2). This means that the likelihood of a case having a successful verdict (guilty verdict) is predicted by the appearance of a suspect in court.

Table 3. The results of Chi-Square test of association, testing the relationship between case outcome and the crime sampling scene procedure.

Effect	χ^2	Df	p
Intercept	0.000	0	
Accused charged/appeared in Court	22.270	12	.035
Fingerprints Taken	1.183	3	.757
Shoeprints	1.911	3	.591
Ballistics taken	4.115	3	.249
DNA taken	2.231	3	.526
Suspects pointed out	5.732	3	.125
Firearm used	3.667	3	.300

Table 4. The Multinomial Logistic Regression analysis output showing the influence of each predictor on case outcome. The reference category used was guilty, to which all case outcomes are compared (B beta coefficient, STD Error Standard error, Wald is the test statistic value and P is Probability).

Outcome of case[a]		B	Std. Error	Wald	Df	P
Withdrawn	Intercept	-.288	2078.823	.000	1	1.000
	[Accused charged/appeared in Court=No]	-18.323	3047.695	.000	1	.995
	[Accused charged/appeared in Court=Yes]	0[c]			0	
	[Fingerprints Taken=No]	-1.067	2118.142	.000	1	1.000
	[Fingerprints Taken=Yes]	0[c]			0	
	[Shoeprints Taken=No]	8.619	321.109	.001	1	.979
	[Shoeprints Taken=Yes]	0[c]			0	

	[Ballistics Taken=No]	-1.882	708.326	.000	1	.998
	[Ballistics Taken=Yes]	0[c]			0	
	[DNA Taken=No]	11.840	325.859	.001	1	.971
	[DNA Taken=Yes]	0[c]			0	
	[Suspects Pointed out=No]	1.351	1.666	.658	1	.417
	[Suspects Pointed out=Yes]	0[c]			0	
	[Firearm used= No]	-1.470	1.437	1.047	1	.306
	[Firearm used=Yes]	0[c]			0	
No arrest	Intercept	14.452	1368.732	.000	1	.992
	[Accused charged/appeared in Court=No]	12.968	1986.817	.000	1	.995
	[Accused charged/appeared in Court=Yes]	0[c]			0	
	[Fingerprints Taken=No]	-11.707	1376.387	.000	1	.993
	[Fingerprints Taken=Yes]	0[c]			0	
	[Shoeprints Taken=No]	-.851	1.824	.218	1	.641
	[Shoeprints Taken=Yes]	0[c]			0	
	[Ballistics Taken=No]	-12.552	468.459	.001	1	.979
	[Ballistics Taken=Yes]	0[c]			0	
	[DNA Taken=No]	1.395	1.378	1.024	1	.312
	[DNA Taken=Yes]	0[c]			0	
	[Suspects Pointed out=No]	-1.407	1.554	.820	1	.365
	[Suspects Pointed out=Yes]	0[c]			0	
	[Firearm used= No]	.258	1.196	.047	1	.829
	[Firearm used=Yes]	0[c]			0	
Pending	Intercept	.223	1839.831	.000	1	1.000
	[Accused charged/appeared in Court=No]	13.486	2399.560	.000	1	.996
	[Accused charged/appeared in Court=Yes]	13.181	2399.560	.000	1	.996
	[Fingerprints Taken=No]	-13.469	1376.387	.000	1	.992
	[Fingerprints Taken=Yes]	0[c]			0	
	[Shoeprints Taken=No]	-2.379	2.074	1.316	1	.251
	[Shoeprints Taken=Yes]	0[c]			0	
	[Ballistics Taken=No]	.904	719.965	.000	1	.999
	[Ballistics Taken=Yes]	0[c]			0	
	[DNA Taken=No]	.476	1.577	.091	1	.763
	[DNA Taken=Yes]	0[c]			0	
	[Suspects Pointed out=No]	2.136	1.853	1.328	1	.249
	[Suspects Pointed out=Yes]	0[c]			0	
	[Firearm used= No]	-1.349	1.347	1.002	1	.317
	[Firearm used=Yes]	0[c]			0	

a. The reference category is: Guilty.

c. This parameter is set to zero because it is redundant.

The Chi-Square of association model disregarded variables that had poor number of observations in some of the variables; they were excluded from the analysis. There was no significant association between case outcome and the results of crime scene evidence for case prosecution (Table 5). However, based on the description in Figure 4, much of the evidence for case prosecution was lacking in large percentage of the cases (see Figure 4).

Table 5. Chi-Square of association results showing relationship between case outcome and evidence for case prosecution.

Effect	χ^2	**Df**	**p**
DNA Report	0.52	3	0.92
Fingerprints positive	2.37	3	0.5
Post-mortem	0.51	3	0.92
Fingerprints on CAS	0.52	3	0.91
Lab photos printed	0.51	3	0.92

Further analysis with the Multinomial Logistic Regression analysis showed that these variables did not significantly explain the variation in case outcome. The model was not significant (χ^2 = 5.63 df = 9 p > 0.05, explaining 11.2 % of the variance in case outcome). Despite these variables selected as being important in the Chi-square analyses, they did not significantly predict case outcome.

Table 6. Model fit results of the Multinomial Logistic Regression analysis showing the influence of the predictor variables associated with case prosecution on case outcome

	Likelihood Ratio Tests		
Effect	χ^2	**df**	**p**
Intercept	0.000	0	
DNA Report	2.773	3	.428
Fingerprints Positive	3.952	3	.267
Post Mortem	.818	3	.845

Table 7. The results of the Multinomial Logistic Regression analysis showing the influence of the crime scene evidence used for prosecution on the case outcome.

Outcome[a]		B	Std. Error	Wald	df	P
Withdrawn	Intercept	-.288	1801.036	.000	1	1.000
	[DNA Report=No]	.000	1273.525	.000	1	1.000
	[DNA Report=Yes]	0[c]			0	
	[Fingerprints Positive=No	.000	0.000		1	
	[Fingerprints Positive=Yes]	0[c]			0	
	[Post-mortem=No]	.000	1273.525	.000	1	1.000
	[Post-mortem=Yes]	0[c]			0	
No arrest	Intercept	25.176	1179.055	.000	1	.983
	[DNA Report=No]	-11.681	2533.822	.000	1	.996
	[DNA Report=Yes]	0[c]			0	
	[Fingerprints Positive=No	-.043	2392.733	.000	1	1.000
	[Fingerprints Positive=Yes]	0[c]			0	
	[Post-mortem=No]	-11.725	833.718	.000	1	.989
	[Post-mortem=Yes]	0[c]			0	
Pending	Intercept	.329	1581.868	.000	1	1.000
	[DNA Report=No]	17.108	1118.549	.000	1	.988
	[DNA Report=Yes]	0[c]			0	
	[Fingerprints Positive=No	-17.213	0.000		1	
	[Fingerprints Positive=Yes]	0[c]			0	
	[Post-mortem=No]	-.105	1118.549	.000	1	1.000
	[Post-mortem=Yes]	0[c]			0	

a. The reference category is: Guilty

c. This parameter is set to zero because it is redundant.

CHAPTER 5: DISCUSSION

In this study, evidence from crime scene investigation is supplied to courts for case prosecution. Internal procedures were not adequately processed in these animal crime scenes (70 cases) as less than 1% of these were provided to courts (see Figure 5, above).

5.1. Case outcomes per police station

In most cases included in this study no arrests were made (see Figure 6 above). Only two police stations, Hoopdal, with 7 cases and Mogwase, with 4 cases, had a guilty verdict in over 20% of their animal crime cases investigated. Cumberland and Northam police stations had the highest percentage of pending cases. Most of the cases were more than one year pending. This could indicate a need to improve the prosecution and court processing in this area. Thabazimbi had the most cases (20) and the guilty verdict was below 20%, which could indicate both poor investigation procedures and poor follow up in this area.

5.2. Arrest outcomes per police station

Hoopdal (4/57.4%) and Mogwase (2/50%) police stations showed the highest number of suspects appearing in court following arrest as shown in Figure 7 above. Multinomial Logistic Regression analysis output showing the influence of each predictor on case outcome The same police stations had the highest number of successful case outcomes with a guilty verdict (Hoopdal (5/71.4%) and Mogwase (3/75%) as shown in Figure 6, while the number of suspects appearing in court was only 27.2% in Dwaalboom. This was due to several cases being withdrawn (more than 60%) (see Figure 6). This could indicate insufficient or incorrect evidence collection procedures in this area.

Generally, it is hoped that the number of arrests, as well as the number of suspects that appear in court, can be related to successful case outcome. In this study, this is not supported by the data (see Figure 7). In the case where suspects did not appear in court, it was due to the poor levels of arrest (see Figure 6). For the cases in which suspects appeared or were charged in court, the case results did not show a successful outcome such as increased rate of guilty charges (see Figure 7). In all cases, 66.2% (47) resulted in no arrest, 8.5% (6) were withdrawn, and 14.1% (10) were still pending. Overall, only 11.3 % (8) cases had a guilty outcome. (see Figure 7). These poor results suggest that there appears to be a general problem in terms of investigation, evidence collection and follow up of cases in which arrests were made. For those

cases in which suspects appeared in court, 33.3 % (6) were not charged; 27.8 % (5) were found guilty, 22.2 % (4) of the cases were withdrawn and 16.7 % (3) were still pending. This would again support the suggestion that a lack of evidence resulted in poor prosecution with suspects not charged and cases being withdrawn.

The model parameters for each of the case outcome categories when compared to the guilty verdict show that the variables associated with crime scene procedure methods did not significantly predict the outcome of the case. This means that there is an equal chance that the case outcome will be any of the four categories of case outcome, namely 'Guilty', 'Withdrawn', 'No Arrest' and 'Pending', regardless of which predictors are used. However, it is clear that getting the suspects to appear in court is a way of achieving a guilty outcome, but this is hampered by poor supporting evidence resulting in charges being withdrawn. The results of Chi-Square test of association, testing the relationship between case outcome and the crime sampling scene procedure provided in Table 4, give an indication of the magnitude and direction of the effect each variable has on the outcome. Relative to case withdrawal, the likelihood of a guilty verdict increases if the suspect appears in court and if DNA evidence is collected (Table 4). If no arrest is made, then the likelihood of prosecution increases when ballistics, fingerprints taken are provided and the suspect appears in court (see Table 4). For pending cases, the likelihood of a guilty verdict will increase if a suspect appears in court and if fingerprints are taken at the crime scene (see Table 4). These results suggest that more effort should be made in the Crime Scene Management process in order to improve prosecution rates.

Forst, Lucianovic & Cox (1977) examined the outcome of cases after arrest. They found that more than 70% of arrests did not lead to conviction, but that three factors were critical to arrests that did: the location of two or more witnesses, the minimization of time from crime incidence to arrest, and the presence of 'tangible evidence.'

For example, a subset of the case for which suspects were charged or appeared was analysed to determine which of the crime scene sampling procedures and which of the internal procedures for case prosecution were important in determining case outcome. A large proportion of these sampling procedures were inadequately conducted for these cases. In the cases that had a guilty outcome, no DNA was collected, but less that two of the suspects were pointed out and a firearm had been used in over 3 of those cases.

5.3 Investigation procedures not done that constitute a weakness in the investigation of animal crime scenes (Section 1)

The data revealed that the following investigation procedures were not executed:

- The animal crime scene collection kits are not stored in a cool place, or the kits are not sent to the laboratories as quickly as possible.
- From the beginning to the end of the animal crime scene investigation, strict anti-contamination measures are not adhered to. They include: wearing protective clothing, gloves and shoe covers; using a single path when entering the scene; keeping away from using any facilities available at the scene (such as a toilet, water, towel, Cell-phones), eating, drinking or smoking; avoiding moving anything or anybody, unless it is of absolute necessity.
- The GPS coordinates are not taken at the correct position or not at all. For all cases attended there was not any single case where GPS coordinates were taken.
- The investigation of fingerprints on animal crime scene investigation is not utilized as a tool.
- Shoe prints are not included, despite the example in Thabazimbi CAS 91/02/2014, where shoeprints were used to link the shoe prints with the shoes of the suspect and the suspect was arrested.
- The first responders, being the law enforcement officers or Park Rangers, human rights officers or anyone else, play a critical role in the entire animal crime scene investigation process. Their initial responsibilities are to preserve the integrity of the scene and the evidence. Furthermore, they are responsible for the early documentation of the crime scene, its evidence and all activities at the scene. As in the majority of cases, first responders are non-forensic personnel and not adequately trained to carry out these tasks.
- A large number of unsupervised personnel on the crime scene increase the likelihood of contamination of evidence on the scene.
- Exhibits such as papers, tissues that are found near the animal crime scene are ignored.
- Light sources are often not used during the animal crimes scene investigations, which could help in fingerprint identification on the tools found at the scene or the horns, for instance.
- The majority of animal crime scene investigators arrive at the scene unprepared, especially without the appropriate equipment and expertise.

- Videos are often not utilized during the animal crime scene investigations. The position where the exhibit was found is not photographed before the scene is disturbed.
- Clear assignment of responsibility at the crime scene is not done.

5.4 Guidelines to improve or assist with the investigation of animal crime scenes in the Thabazimbi area (Section 2)

The evidence that is recovered at the scene must ultimately reach a forensic laboratory in a way that maintains its integrity and identity. The storage of samples for DNA analysis is extremely important with cooling and freezing at the scene if there will be a delayed transfer to the laboratory. Other items can be affected by handling for example bullets must be washed carefully with water to remove blood traces and items must be handled with gloves and packaged in appropriate containers to avoid contamination of human DNA traces and removal of fingerprints. Preservation of biological material can best be done by air drying and cooling. Most biological evidence is preserved when stored in cool, dry conditions. These conditions reduce the rate of degradation caused by fungi and bacteria.

The following guidelines were drawn from the study:

- Specifically designated evidence collection kits should be used. Exhibits must be securely packed to prevent breakage and seals must be intact and certified at the place of collection to ensure the chain of custody.
- All collected items must be marked for identification purposes and photographed at the scene. Secured access during transportation and storage will prevent any unauthorized access and possible tampering or loss of evidence. The same person must handle the items as far as possible to shorten the chain of custody.
- GPS coordinates must always be recorded in every animal crime scene.
- The number of persons entering the animal crime scene must be limited and the wearing of disposable PPE (disposable coats, gloves, foot and head covers) must be encouraged to limit a person from contaminating crime scene with his or her own genetic material.
- Use of forensic tools such as cellphone and electronic data collection, toxicology and veterinary pathologist reports must be encouraged and utilized. Laboratories identified as having expert forensic analysts can provide these services. This evidence must be included in training and training manuals in the SAPS curriculum.

- The appropriate animal identification and handling techniques must be followed and these must be included in the training of investigators responsible for animal crime cases.
- All constitutional and statutory requirements that regulate the collection as stated in Section 37(1) of the Criminal Procedure Law 51 of 1977 and handling of samples must be met, maintaining a chain of custody.

5.5 Limitations of the research

The research was limited due to ethical considerations and the type of agreement with SAPS and University of Pretoria as presented in the letter of approval in **Addendum 1.**

The research was conducted in only the Thabazimbi area over a limited period and does not reflect the outcomes in other areas.

As the sample population was small, generalisations should be treated with caution.

CHAPTER 6: CONCLUSION

The goal of this study was to come up with a structured evidence to show how animal crime scene is investigated in the Thabazimbi area and evaluate the process in relation to the prosecution outcome.

Data presented in this work provide novelty to the field of animal forensics as it has highlighted the considerable shortcomings in the investigation of animal crime scene in the study area, and in this sense make a contribution to science.

In this study, it was evident that animal crime scene investigations are not properly investigated. Our literature review also shows that stock theft is also a big problem especially in farming communities and poaching.

From this study one can conclude that getting the suspects to appear in court is the best way of achieving a guilty outcome, but this is hampered by poor investigation and follow up. The results further show that a lack of evidence leads to cases being withdrawn even when suspects are charged and appear in court. Only 8 out of 71 (11%) of animal related cases reported here and investigated, had guilty as a verdict in this study area over the period 2013 to 2015.

The study concluded with recommendations of the weaknesses in the investigative process, that emerged from the analysis, discussed under Section 1. Furthermore, guidelines for improvement that emerged from the analysis are discussed under section 2 and may be of use for future crime scene investigations and management orfor further studies.

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Supplementary Table 1 Case Data

Ref no	Station	DNA Repo	Ballistic R	Fingerprir	Fingerprir	Photograp	Toxicolog	Pathology	Fingerprir	Etch	Post Mort	Rhino Poa	Person ini	Fingerprin	LAB Photo	Accused charged or appea	Outcome	Date Finalized
1	Thabaziml	0	0	0	0	1	0	0	0	0	0	0	1	0	0	1	Guilty	2013.07.01
2	Northam	0	0	0	0	1	0	0	0	0	0	0	1	0	0	1	withdrawn	2014.09.01
3	Thabaziml	0	0	0	0	1	0	0	0	0	0	0	1	0	0	1	withdrawn	2015.03.12
4	Thabaziml	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	No arrest	Not finalized
5	Thabaziml	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0	No arrest	Not finalized
6	Mogwase	0	0	0	0	1	0	0	0	0	0	0	1	0	0	1	No arrest	Not finalized
7	Thabaziml	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	No arrest	Not finalized
8	Mogwase	0	0	0	0	1	0	0	0	0	0	0	1	0	0	1	No arrest	Not finalized
9	Thabaziml	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0	No arrest	Not finalized
10	Northam	0	0	0	0	1	0	0	0	0	0	1	1	0	0	1	Pending	Not finalized
11	Mogwase	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0	Guilty	2014.04.29
12	Northam	0	0	0	0	1	0	0	0	0	0	1	1	0	0	outstanding-no LO	Pending	Not finalized
13	Northam	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0	Pending	Not finalized
14	Northam	0	0	0	0	1	0	0	0	0	0	1	1	0	0	1	No arrest	Not finalized
15	Thabaziml	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	No arrest	Not finalized
16	Dwaalboo	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	No arrest	Not finalized
17	Cumberla	0	0	0	0	1	0	0	0	0	0	0	1	0	0	1	Pending	Not finalized
18	Thabaziml	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	No arrest	Not finalized
19	Cumberla	0	0	0	0	1	0	0	0	0	0	0	1	0	0	no case	No arrest	Not finalized
20	Hoopdal	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	No arrest	Not finalized
21	Dwaalboo	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	No arrest	Not finalized
22	Hoopdal	0	0	0	0	1	0	0	0	0	0	0	1	0	0	1	No arrest	Not finalized
23	Rooiberg	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	Guilty	2013.10.14
24	Hoopdal	0	0	0	0	1	0	0	0	0	0	1	1	0	0	1	No arrest	Not finalized
24	Dwaalboo	0	0	0	0	1	0	0	0	0	0	1	1	0	0	1	No arrest	Not finalized
25	Dwaalboo	0	0	0	0	1	0	0	0	0	0	1	1	0	0	1	withdrawn	2014.06.11
26	Dwaalboo	0	0	0	0	1	0	0	0	0	0	attempted	1	0	0	no csae	withdrawn	2014.06.11
27	Dwaalboo	1	0	1	0	1	0	0	0	0	0	0	1	1	1	Still to appear before court	No arrest	Not finalized
28	Cumberla	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	No arrest	Not finalized
29	Thabaziml	0	0	0	0	1	0	0	0	0	0	0	1	0	0	1	Guilty	Not finalized
30	Rooiberg	0	0	0	0	1	0	0	0	0	0	0	1	0	0	1	Withdraw	Not finalized
31	Rooiberg	0	0	0	0	1	0	0	0	0	0	0	1	0	0	no case	No arrest	Not finalized
32	Northam	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	No arrest	Not finalized
33	Hoopdal	0	0	0	0	1	0	0	0	0	0	1	1	0	0	1	Guilty	2014.02.07
34	Hoopdal	0	0	0	0	1	0	0	0	0	0	0	1	0	0	1	Guilty	2014.02.07
35	Thabaziml	0	0	0	0	1	0	0	0	0	0	0	1	0	0	1	Guilty	2013.11.01
36	Thabaziml	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	Pending	Not finalized
37	Northam	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	No arrest	Not finalized
38	Rooiberg	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	No arrest	Not finalized
39	Dwaalboo	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0	No arrest	Not finalized
40	Hoopdal	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	No arrest	Not finalized
41	Cumberla	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	No arrest	Not finalized
42	Rooiberg	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	No arrest	Not finalized
43	Northam	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	No arrest	Not finalized
44	Thabaziml	0	0	1	0	1	0	0	0	0	0	0	1	0	0	0	Pending	Not finalized
45	Rooiberg	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	No arrest	Not finalized
46	Northam	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	No arrest	Not finalized
47	Rooiberg	0	0	0	0	1	0	0	1	0	0	0	1	0	0	0	No arrest	Not finalized
48	Thabaziml	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0	No arrest	Not finalized
49	Thabaziml	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	No arrest	Not finalized
50	Thabaziml	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	No arrest	Not finalized
51	Thabaziml	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	No arrest	Not finalized
52	Rooiberg	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0	No arrest	Not finalized
53	Dwaalboo	0	0	0	0	1	0	0	0	0	0	0	1	0	0	1st Apperance 2014.06.10	Pending	Not finalized
54	Northam	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	No arrest	Not finalized
55	Thabaziml	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	No arrest	Not finalized
56	Cumberla	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	Guilty	2014.11.27
57	Dwaalboo	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	No arrest	Not finalized
58	Thabaziml	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	No arrest	Not finalized
59	Thabaziml	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	No arrest	Not finalized
60	Dwaalboo	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	withdrawn	2015.03.12
61	Northam	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	Pending	Not finalized
62	Northam	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	Pending	Not finalized
63	Cumberla	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	Pending	Not finalized
64	Dwaalboo	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	No arrest	Not finalized
65	Hoopdal	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0	No arrest	Not finalized
66	Mogwase	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	No arrest	Not finalized
67	Thabaziml	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	No arrest	Not finalized
68	Cumberla	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	No arrest	Not finalized
69	Northam	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	No arrest	Not finalized
70	Northam	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0	No arrest	Not finalized

ADDENDUM 1 Permission letters

South African Police Service

South African Police Service

Private Bag X322	Fax No:	012 421-0401
Your reference:	3/34/2	THE DIVISIONAL COMMISSIONER
My reference:		FORENSIC SERVICES
Enquiries:	Major NM Rababalela	PRETORIA
		0001
Tel:	(012) 421-0204	

The Head
STRATEGIC MANAGEMENT

RE: RESEARCH REQUEST: EVALUATION OF CURRENT ANIMAL CRIME SCENE INVESTIGATION METHODS AND THE DEVELOPMENT OF GUIDELINES FOR THE EVALUATION OF ANIMAL CRIME SCENE IINVESTIGATION PROCEDURES IN THE THABAZIMBI AREA: MASTERS DEGREE, UNIVERSITY OF PRETORIA: RESEARCHER: TI RAMALEKANA

1. Your communiqué with reference 3/34/2 dated 13 June 2014 bears reference.

2. Approval is hereby granted to the above-mentioned request, provided that the applicable directives on conducting research are adhered to.

Kind Regards

MAJOR GENERAL
Acting/DIVISIONAL COMMISSIONER: FORENSIC SERVICES
TJV KHUNOU

DATE: 24/06/14

SUID-AFRIKAANSE POLISIEDIENS

SOUTH AFRICAN POLICE SERVICE

SAP 21

Verwysing Reference	2/1/2/1(10/2013)
Navrae Enquiries	Col Mashile Major Montjane
Telefoon Telephone	015 290 6090/ 6202
Faksnommer Fax number	015 230 1023

ORGANIZATIONAL DEVELOPMENT
AND STRATEGIC MANAGEMENT
SOUTH AFRICAN POLICE
POLOKWANE
LIMPOPO

A: National Commissioner
South African Police Service
Pretoria
0001

(Att: Major Gen Menziwa)

B: Thomas Ishmael Ramalekana
Thabazimbi LCRC
Private Bag 49
Thabazimbi
0380

AUTHORITY TO CONDUCT RESEARCH ON EVALUATION OF CURRENT ANIMAL CRIME SCENE INVESTIGATION METHODS AND THE DEVELOPMENT OF GUIDELINES FOR THE EVALUATION OF ANIMAL CRIME SCENE INVESTIGATION PROCEDURES IN THE THABAZIMBI AREA: MASTERS DEGREE STUDY: UNIVERSITY OF PRETORIA: RESEACHER: TI RAMALEKANA

A.1. Copy for your information.

B.1 Your application for authority to conduct research indicated above refers.

2. An authority is therefore granted with condition that such research is conducted within the given scope.

3. You are also advised to adhere to the provisions of the National Instruction 1/2006 on research in the SAPS.

.....LIEUTENANT GENERAL
PROVINCIAL COMMISSIONER
LIMPOPO PROVINCE
SF MASEMOLA

DATE: 2013 -09- 25