SADC Regional Programme for Rhino Conservation

RHINO HORN STOCKPILE MANAGEMENT

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Improving security and management of rhino horn stocks in SADC rhino range states
Semester 5 task 3.1-1.1: Technical Paper 1

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The Programme is contracted to CESVI and implemented through a regional consortium which comprises:

- The Secretariat of the Southern Africa Development Community (SADC)
- IUCN-ROSA (The World Conservation Union - Regional Office for Southern Africa)
- The IUCN African Rhino Specialist Group
- WWF-SARPO - (World Wide Fund for Nature - Southern Africa Regional Programme Office)
- CESVI (Cooperazione e Sviluppo)

The ***Programme goal*** is to contribute to maintain viable and well distributed metapopulations of Southern African rhino taxa as flagship species for biodiversity conservation within the SADC region.

The ***Programme objective*** is to implement a pragmatic regional rhino strategy within the SADC region following the acquisition of sound information on, firstly, the constraints and opportunities for rhino conservation within each range state and secondly, the constraints and opportunities for rhino metapopulation management at the regional level.

DISCLAIMER

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RHINO HORN STOCKPILE MANAGEMENT

SADC REGIONAL PROGRAMME FOR RHINO CONSERVATION

TASK 2.2-2: IMPROVING SECURITY AND MANAGEMENT OF RHINO HORN STOCKS IN SADC RHINO RANGE STATES

TECHNICAL PAPER 1: DISCUSSION PAPER

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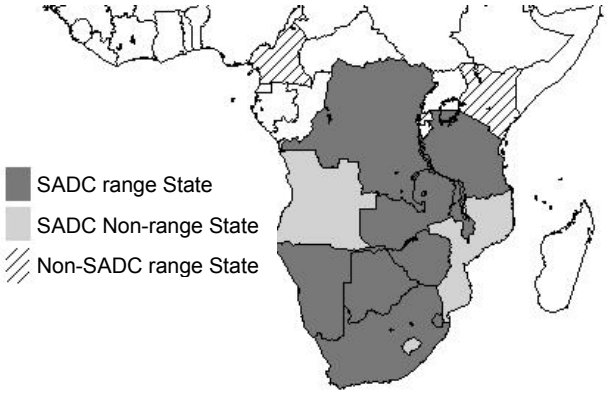
1 INTRODUCTION

Large-scale poaching of rhinos to supply horns for markets in the Middle and Far East decimated many populations during the 1970s and 1980s. In response, a plethora of interventions worldwide has helped to reverse this trend in many areas resulting in a strong revival of numerous rhino populations, particularly in Africa. Recent figures show that continental black rhino numbers increased from 2,704 to 3,100 and white rhinos from 10,405 to 11,670 between 1999 and 2001.



Threats to wild rhino populations nevertheless remain, and the illegal trade in rhino horn continues to be their greatest danger globally. However, whilst the focus of preventing illegal trade in Africa has traditionally focussed on ensuring adequate field protection and infiltrating illegal trade syndicates, it is increasingly clear that the potential for illegal trade from horn stockpiles could seriously undermine ongoing conservation efforts. Not only do significant quantities of rhino horn already occur within the SADC region, but also they are likely to carry on increasing in volume so long as wild populations continue to prosper. In order to minimise the risk of horn reaching the illegal market, it is therefore essential to ensure that firstly existing stockpiles are adequately registered and secured, and secondly, that the collection and centralisation of all horns from the field is optimised. Indeed, the need to mark, register, store and secure rhino horn stockpiles was recognised by Parties to CITES when Resolution Conf. 9.14 (Rev.) was adopted at the eleventh Conference of the Parties to CITES in Kenya, April 2000.

In order to better understand and mitigate this threat, it is important to first understand *what* do we mean by 'horn stocks', *where* these horn stocks currently exist and *how* they accumulate. Secondly, what needs to be done to better understand and manage the *flow* of horn into and between different stocks, in order that potential loopholes for illegal trade are minimised. This discussion paper aims to introduce and justify the importance of these issues as well as some concepts of rhino horn stockpile management in the SADC region. Many of these issues are being dealt with in more detail by TRAFFIC in collaboration with rhino range States, as part of the SADC Regional Programme for Rhino Conservation RPRC).

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2. DYNAMICS OF HORN STOCKPILE ACCUMULATION

2.1 Location of rhino horns

Rhino horns are currently found in three major categories or 'sinks', each of which can be broadly subdivided according to their ownership and location.

LIVE RHINOS	HORN STOCKS	ILLEGAL TRADE CHAIN
State	Government stockpiles	In sale
Private	Privately held stocks	In transit
Communal	Museums	Storage for prospective sales
Captive	Research	Personal, unregistered items

(i) **Live rhinos**: In the SADC region, confirmed rhino populations occur in eight countries: Botswana, Democratic Republic of Congo, Malawi, Namibia, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe (Table 1). Whilst most countries recognise meta-population management of rhinos at the national level, ownership and management of individual populations may be government, private, communal or through partnerships. Some captive populations also exist in the SADC region, although they predominate outside the continent.

Table 1. Confirmed wild populations of black and white rhinoceros in Africa, 2001

Rhino species	Africa Range States
Black rhino *Diceros bicornis*	Cameroon, Kenya, Malawi, Namibia, Rwanda, South Africa, Swaziland, Tanzania, Zimbabwe
White rhino *Ceratotherium simum*	Botswana, Democratic Republic of Congo, Kenya, Namibia, South Africa, Swaziland, Zambia, Zimbabwe.

(ii) **Horn stocks**[2]: Most governments in the region hold horn stockpiles, normally by the respective wildlife departments. The majority of these horns have accumulated from natural mortalities, seizures and dehorning operations. Private individuals, captive breeding facilities, museums, research and other institutions also hold rhino horns. Many of these horns have either come from sport trophy-hunted animals or are pre-CITES personal items / scientific specimens.

(iii) **Illegal trade chain**: The illegal trade chain includes not only horns in transit and being actively sold between middlemen, but also horns stored by prospectors for future sales. Further, this category includes personal, unregistered horns kept in the private sector, irrespective of whether the owner intends to trade or not. Unlike live populations and stockpiles that are relatively well understood, the quantity of horn and the flow of horns on the illegal market are poorly understood at the regional level.

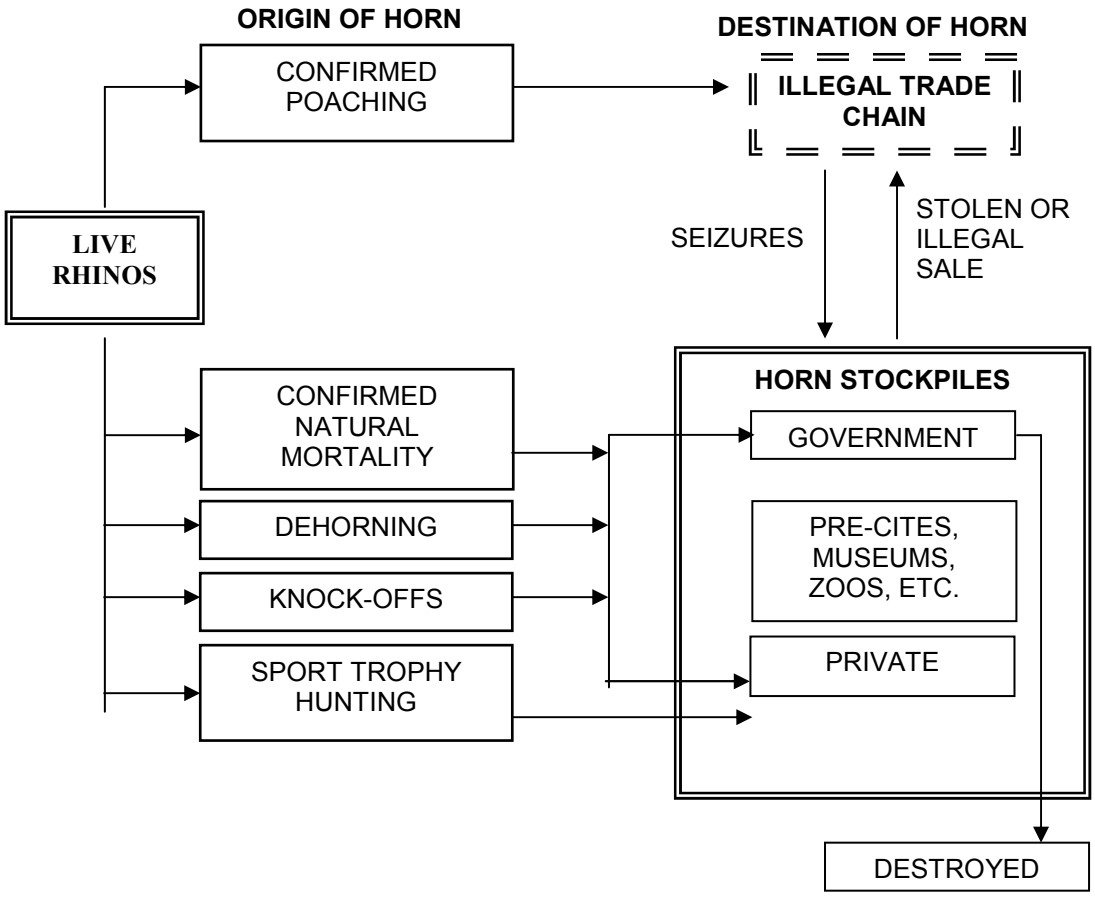
2.2 Accumulation of 'legal' stocks

A simplistic view of horn flow between live rhinos, horn stocks and illegal trade chains is illustrated in Figure 1. There are four major routes in which horns from live rhinos may move to become **horn stocks** (government and private). Depending on the population size, standard of monitoring and horn recovery rates (see section 4.2), a proportion of horns recovered from **natural mortalities** (including senescence, disease and fighting) should be deposited in stockpiles. On State land, rangers collect these horns, later to be centralised in government strong rooms. On non-government land, horns may be either handed over to

[2] '*Horn stocks*' as defined in this document includes both *actual* stocks (existing stockpiles or accumulations of rhino horns in private and government sectors) and *potential* stocks (i.e. collected horns that have not yet found their way to such stockpiles).

government authorities or retained by private owners. Growing wild rhino populations in some east and southern African countries is resulting in corresponding increases in the numbers of horns retrieved from natural causes. Horns recovered from **dehorning** and 'tipping' operations, and horns **broken off accidentally** (during or after translocation) should also be deposited in these stockpiles.

Figure 1. Simplistic view of rhino horn movement.



In some areas, rhinos may be legally **trophy hunted**; the majority of sport-hunted trophies are exported and held by individual private owners (Table 2). According to CITES annual reports, major importing nations of rhino horns and trophies include the US, Spain, Germany, The Netherlands and South Africa.

Table 2. Imports and exports of rhino 'horn' and 'trophies', 1973-1999

	Exporting nations' data			Importing nations' data		
Item description	**kg**	**sets**	**unspec.**	**kg**	**sets**	**unspec.**
Horns	213.4	6	1,179	480.6	7	505
Trophies			860	40.0		998

Source: UNEP-WCMC database, Cambridge, UK

A significant proportion of private stockpiles may also consist of **pre-CITES** specimens, mostly as personal or scientific items (i.e. horns collected before rhinos were listed on the CITES appendices and therefore held legally if registered).

2.3 Accumulation of 'illegal' stocks

The illegal trade in horn has remained the greatest threat to rhinos worldwide since the 1970s. Unless they are intercepted, all horns from **poached rhinos** enter the illegal trade chain. Significant emphasis has therefore been placed on minimising the most immediate threats to wild populations by ensuring adequate field protection and infiltrating illegal trade syndicates. To the credit of these law enforcement agencies, significant quantities of horn have been accumulated through trade control and anti-poaching efforts carried out in range States, consumer markets and trade entrepôts.

Poached rhino horns entering illegal trade may be supplemented by horn **thefts** from existing stockpiles (private or government). Thefts have occurred as recently as 2000 although the largest known number of horns stolen was 54 white rhino horns/pieces weighing 150 kg, stolen from Pilanesburg National Park, South Africa, between December 1986 and January 1987. **Illegal sales** from stocks provide another means for horn to enter the illegal market. The ability to detect this clearly depends upon the level of tracking and monitoring mechanisms for existing stockpiles (see section 4.3).

Thus, in addition to intercepted horns originating from poached animals, **seizures** may also include stolen horns and horns illegally sold from the various private or government-held stocks.

2.4 Accumulation patterns

The proportion of horns emanating from these different sources[3] may vary tremendously depending on the type and ownership of the rhino population, biological factors, management systems, poaching, law enforcement levels and many other factors. For example, Botswana's rhino population increased by 41% between 1993 and 2000 whilst horn stocks increased by 38%, mostly collected from natural mortalities and some seizures. In contrast, Zimbabwe's horn stocks, currently one of the largest in Africa, grew by the same rate between 1992 and 2000, although the wild population experienced an overall decline during this period. The increase in Zimbabwe's stock was largely attributed to high rates of seizures and large-scale dehorning exercises in the early and mid-1990s followed by successively greater quantities of horns collected from natural deaths as the country's rhino populations recovered. Different stock accumulation scenarios are found in South Africa (where large numbers of hunting trophies are exported), in United Republic of Tanzania (which traditionally served as a regional trade route and entrepôt), and in Zambia and Kenya (where all government-held stocks were destroyed in the early 1990s).

3. IMPORTANCE OF TRACKING ACTUAL AND POTENTIAL HORN STOCKS

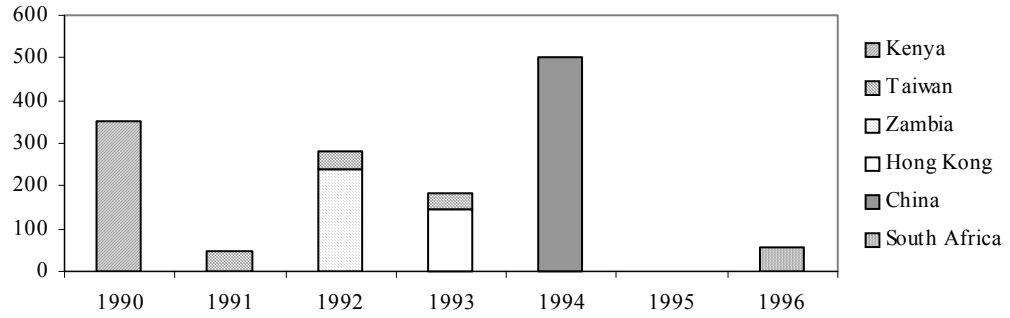
3.1 Potential loss of horn to illegal trade chains

Whilst the simplistic model illustrated in Figure 1 is useful in terms of identifying the different sources of horn moving into stockpiles, it places little emphasis on the **potential loss** of horn *en route* to being deposited in stockpiles. The likelihood of *potential* horn stocks moving into the illegal trade chain, either deliberately or accidentally, is increased by two important factors. Firstly, the movement of horns into stockpiles may involve **numerous personnel** and even different departments and institutions. The more players involved, the greater the potential for horn to accidentally or deliberately disappear. For example, a State-owned stockpile may include horns collected from the police (seizures), customs (seizures), Parks authority (mortalities) and veterinary department (dehorning). Ensuring all horns actually reach the stockpile requires stringent procedures within and between different bodies. As another example, a horn collected from a dead rhino in the field may pass through five or six pairs of hands before being handed in at a central strong room.

[3] For example, horns from natural mortalities, dehorning, knock-offs, seizures, sport hunting trophies, pre-CITES items, thefts and illegal sales.

Secondly, there may be **numerous fates** for these horns. Whilst the majority of horns collected are simply secured and held in storage, stocks may be frequently moved between locations. For example, the movement of horn from the field to an out-posted storeroom and on to a central strong room or bank vault. Another example would be the movement of horn between the police and wildlife department during an ongoing court case. Private horn owners may also move residences, sometimes between different countries. On occasion, horns may be donated to museums or research institutions, and privately owned horns are sometimes entrusted to government bodies. Further, several governments have destroyed their horn stock partially or completely, either to remove any possibility of them entering a horn market, or to remove the risk of cross-contamination from insect infestation (Figure 2).

Figure 2. Graph showing horn stocks (kg) destroyed in six countries during 1990-1996.



Source: TRAFFIC Rhino Horn and Product Database (2001).

In summary, the management and security of horn stocks is complicated by the fact that they come from **numerous sources**, involve **several players** and may be subject to **different fates**. Further, horn stocks may be under different ownership, comprise both legal and illegal stocks, and include international movements, both imports and exports.

Figure 3 illustrates how the potential for an illegal sale (or accidental loss) exists at many junctures. Appropriate measures regarding horn stockpiles are therefore necessary to complement ongoing interventions to prevent illegal poaching and illegal horn trade (Figure 4). **Existing government and private horn stockpiles** (*actual* stocks) therefore need to be registered and marked properly to reduce the possibility of illegal sales and losses. This includes sport trophies, pre-CITES, scientific and personal specimens. Regarding the **flow of horn** into stockpiles (*potential* stocks), appropriate checks and balances are necessary between every person and agency handling horn as it moves to a stockpile. Naturally, all stockpiles need to be kept as secure as possible to prevent theft.

3.2 CITES Resolution Conf. 9.14 (Rev.)

At the eleventh Conference of the Parties to CITES in April 2000, Parties adopted CITES Resolution Conf. 9.14 (Rev.) 'Conservation of an trade in African and Asian rhinoceroses'. Whilst acknowledging the many successes and advances in rhino conservation worldwide, it recognised the need for continued efforts and specific interventions. This Resolution, the only one of its kind specific to rhinos, clearly recognises the need for appropriate monitoring and counter measures to minimise the risk of horn stockpiles entering illegal trade. It urges '**all Parties that have stocks of rhinoceros horn to identify, mark, register and secure all such stocks**'. Further, horn stocks are one of several details that should be submitted by all Parties in a biannual report to the CITES Secretariat six months before every Conference of the Parties to CITES. Amongst other issues, the Resolution also urges 'all Parties to adopt and implement comprehensive legislation and enforcement controls, including internal trade restrictions and penalties, aimed at reducing illegal trade in rhinoceros parts and derivatives' and 'that law enforcement cooperation between and among States be increased in order to curtail illegal trade in rhinoceros horn'.

Figure 3. Flow diagram highlighting the potential for horn to enter illegal trade chains

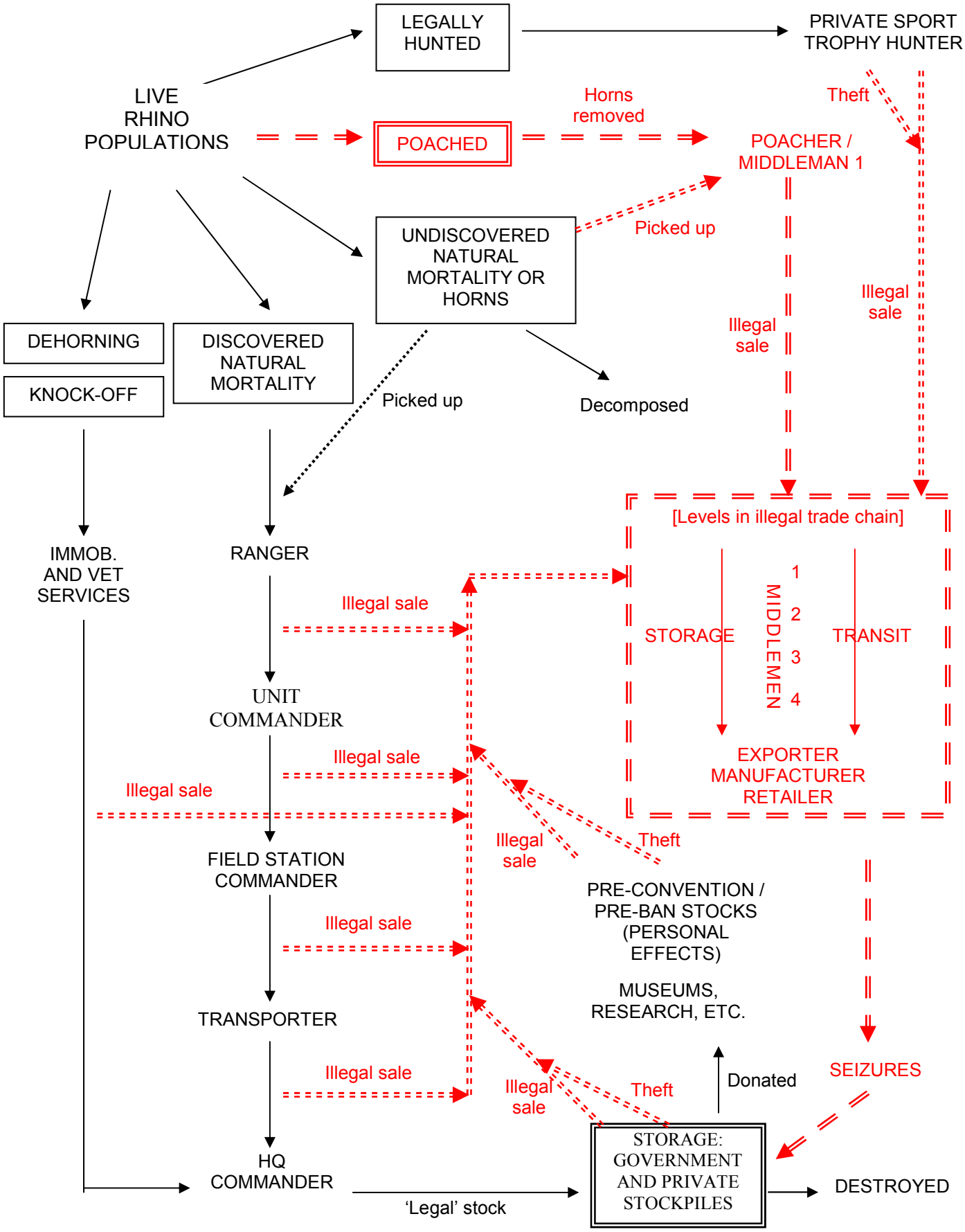
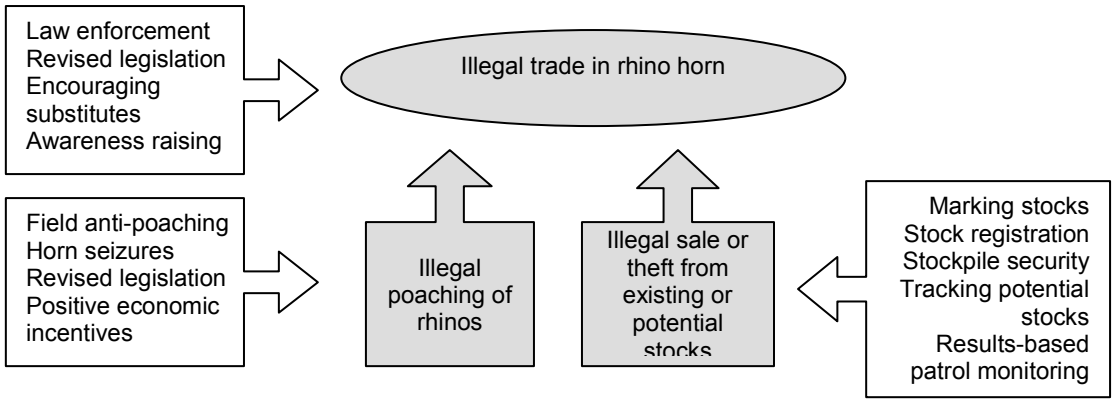


Figure 4. Sources of illegal horn and some modes of intervention



3.3 Current and future trends

The importance of instigating counter measures to reduce the risk of horns moving from existing and potential stocks to illegal trade chains is exacerbated by several factors. Firstly, some existing stockpiles are already very **large**, up to 3,500 kg in weight. It is considerably easier for horns to go missing from larger stockpiles than from smaller stockpiles. Secondly, many stockpiles are **growing** quickly in size, and are likely to continue to increase as rhino populations expand. This highlights the need to have stock management measures in place before horn volumes get too large to handle.

Indeed, given the current known levels of illegal trade (poaching and seizures), it is possible that an illegal supply of horns from actual or potential horn stockpiles could actually exceed supply from wild populations if appropriate stockpile management measures are not in place. This is of course quite different from the situation in the 1970s and 1980s when so much horn came from poached rhinos. Nowadays, wild populations are afforded far greater protection and it is vital to ensure that equal attention is given to stockpile management.

In addition, the management and security of horn stockpiles – as with elephant ivory stockpiles – can place an enormous **financial and logistical** burden on management authorities. It is therefore important to identify the most cost-effective use of limited resources and for managers to be able to justify appropriate levels of logistical support.

The total quantities of horns stockpiles in Africa (around 15,000 kg) are estimated to be approximately equal to those outside Africa. Whilst stockpiles in Africa continue to grow, it should be remembered that some legal stocks in Asia (in addition to illegally stockpiled horn) continue to be depleted. We are therefore in a unique situation when increasing stocks in Africa have roughly equalled declining stocks elsewhere. This could have important implications on the **supply-demand trade dynamics** of rhino horn trade, including the possibility that declining and insufficient supplies of horn may stimulate pressure not only on wild rhinos but also on stockpiled horn in Africa as well as *potential* horn stocks collected from the field.

Lastly, just as numerous examples of rhino conservation have proved successful in different east and southern African countries, there are also many good examples of **'best management practices'** for rhino horn stockpile management practices. There is a good opportunity to learn and promote these good examples not only within the SADC region but also outside Africa (e.g. China and Taiwan) where equally large horn stocks exist, as recommended in CITES Res. Conf. 9.14 (Rev.).

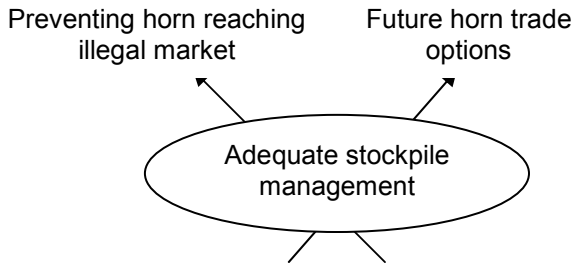
3.4 Trade in rhino horn

South Africa has previously shown interest in a limited, legal trade in white rhino horn. A proposal submitted at the ninth Conference of the Parties to CITES in 1994 was rejected and a proposal was drafted but subsequently withdrawn in preparation for the twelfth Conference of the Parties to CITES in 2002. Further knowledge about rhino horn stocks can assist the

understanding of rhino horn trade dynamics, and could potentially play a useful role in helping to develop credible models of rhino horn consumption and legal production in the future. However, this is complicated by numerous factors including: unknown market changes and current demand levels in all consumer nations in light of significant legislative reform and promotion of substitutes over the past 30 years; the likely impact on the endangered Javan and Sumatran rhinos whose horn is considerably more valuable than African rhinos; and the potential impacts on less protected and endangered subspecies in Africa (Northern white rhinoceros *Ceratotherium simum cottoni* in DRC and Western black rhino *Diceros bicornis longipes* in Cameroon).

Nevertheless, it is possible that South Africa, and perhaps other countries, may chose to pursue options for legal horn trade in the future. Existing deficiencies in horn stockpile management present a major loophole for illegal trade and undermine legal trade options (Figure 5). Indeed, the following actions were amongst several others recommended by a working group at the 2002 meeting of the IUCN/SSC African Rhino Specialist Group before any sensible debate could ensue regarding any South Africa proposal to trade rhino horn: (i) adequate and standardised rhino horn stockpile management (including the marking, measuring, registration and security), covering both government and private sectors; (ii) registration of all horn stockpiles in the country at provincial level to minimise the potential of illegal trade and to allow equal trade opportunities for both private and government sectors; (iii) combining provincial registers into a central national stockpile database; and (iv) incorporating rhino horn registration into national legislation and policy.

Figure 5. Adequate stockpile management as a vital precursor for both horn trade options and reducing illegal trade



4. HORN STOCKPILE MANAGEMENT AS A MULTIPURPOSE TOOL

4.1 Current state of knowledge

As discussed above, the relationships between the three rhino horn categories or 'sinks' (including the *actual* and *potential* horn flow from one category to another) need to be monitored and managed carefully to identify possible leaks and prevent the flow of horn onto the illegal market. A brief gap analysis reveals that in decreasing order, the level of current knowledge regarding quantities of horn held in each of the three categories is: (i) live rhinos; (ii) horn stocks; and (iii) illegal trade chains (Table 3).

Most national rhino population estimates in the SADC region have good confidence intervals, with mortality and recruitment rates well documented in many areas. Possible exceptions currently under review include the larger populations of Etosha National Park, Namibia, and Kruger National Park, South Africa. Overall, the quantities of **'standing horn'** are well known at national and regional levels. Existing stockpiles of horn are also well documented, with the exception of the private sector especially in South Africa. At the regional level, the only information available regarding illegal trade is incidences of illegal poaching and horn seizures.

Currently, the main deficiencies concern the registration and security mechanisms for existing horn stocks, as well as the reconciliation processes to ensure all *potential* horn stocks do end up in *actual* stockpiles and that acceptable levels of horn are being recovered from the field.

As to be expected, any such deficiencies are of paramount importance with larger rhino populations and larger horn stockpiles. Many of the existing deficiencies may be remedied through more enhanced horn management practices concerning actual and potential stocks. With the assistance of the SADC RPRC and WWF, TRAFFIC is currently undergoing a project to document existing management practices, and to identify and promote good examples of practice throughout the region. As outlined below, this includes both results-based field monitoring (section 4.2) and the numerous practical aspects of stockpile management (section 4.3).

Table 3. Gap analysis of existing knowledge regarding rhino horn 'sinks'

Category	Existing state of knowledge	Existing deficiencies
Live rhinos	Population estimates generally good. 2001 estimates 3,100 black rhino and 11,670 white rhino. Therefore, 'standing horn' estimates fairly well known at national levels, around 29,500 horns (including all age classes).	Lower accuracy of population estimates in some larger populations. Poor understanding of mortality rates and causes of death in some larger populations, resulting in higher number of 'lost rhino' and/or 'lost horn'.
Horn stocks	Total of over 10,200 kg rhino horn documented by the TRAFFIC RHPD[4] in SADC countries. Estimated total around 15,000 kg.	Inconsistent registration, security and audit mechanisms leaving potential loopholes for illegal trade. Registration of horns in private sector.
Illegal trade chain	Numbers of seizures and rhino poached known – relatively low in comparison with wild rhinoceros population levels.	Poor knowledge linking *potential* horn stocks with *actual* stocks, under different accumulation rates, and therefore difficult to get a true idea of potential quantities in illegal trade.

4.2 'Lost horn' and results-based field monitoring

One of the greatest existing gaps in knowledge with respect to horn stocks is the fate of **undetected rhino carcasses** (Figure 3). In larger populations in particular, the detection of a dead rhino, let alone the precise cause of death, may not be known in a significant number of cases. In terms of horn stocks, this may effectively result in **'lost horn'** whose destiny remains uncertain. Some horn may eventually be found by rangers and handed in. Alternatively, poachers may pick up some horn, whilst rangers may indeed pick up but illegally trade in other horn. Alternatively, rhino carcasses, and horns, may never be found. Regarding the possibility that some horn may go astray, many field managers express concern on how to ensure field patrols locate carcasses and subsequently hand in all the collected horn.

These 'lost horns' can produce the greatest levels of uncertainty when estimating the amount of horn entering the illegal market - a vital **indicator** for rhino conservation (when used in conjunction with other key indicators such as population performance, poaching levels, etc.). This is in contrast to incidences of poaching and horn seizures, which are well documented with much lower levels of uncertainty. The greater the levels of uncertainty, the greater the disparity between known, **definite** illegal offtake and **possible** illegal offtake. One example given in Table 4 shows how a difference in rhino carcass detection rates (and determination of death) can directly change the disparity. It can be seen that both increased efficiencies of finding carcasses and determining their cause of death can greatly improve the accuracy of

[4] The TRAFFIC Rhino Horn and Product Database (RHPD) was initiated in 1999 with funding from WWF to document rhino horn stocks worldwide. It currently contains over 1,700 records from 54 countries and forms the basis for ongoing work to assist CITES Parties with implementation of CITES Resolution Conf. 9.14 (Rev.).

estimating the number of horns reaching the illegal market. In cases where few of the actual mortalities are detected, it may simply be never known how much illegal offtake is really occurring. Where only a few detected mortalities have their horns recovered, there will be a greater disparity between definite illegal offtake and possible illegal offtake.

Table 4. Varying degrees of 'lost horn' in an imaginary rhino population.

In an imaginary rhino population of 300 animals, there were eight mortalities in one year.

Scenario 1: Poor carcass detection rate and determination of cause of death

During the year, only three carcasses were found; one confirmed poaching and two whose cause of death was unknown. Two horns had been removed from the poached rhino. Only two horns were recovered, the two horns from the other rhino were never found. It is not known whether these decomposed, or were perhaps picked up and illegally traded by someone. Therefore, the **known** illegal trade (K) was 2 horns, whilst the **possible** illegal trade based on discovered carcasses (P_1) was 4 horns ($P_1 = 2 \times K$). Unknown to the management since they had not been discovered, a further five rhinos died and whose horns were never recovered. Therefore, the **potential** illegal trade based on discovered and undiscovered carcasses (P_2) was 14 horns ($P_2 = 7 \times K$).

Scenario 2: Good carcass detection rate and determination of cause of death

During the year, seven carcasses were discovered; two confirmed poaching, two from old age, one from fighting and two whose causes of death were unknown. Four horns had been removed from the two poached rhinos. Eight horns were also recovered, and two horns from the other rhino were never found. Therefore, the **known** illegal trade (K) was 4 horns, whilst the **possible** illegal trade based on discovered carcasses (P_1) was 6 horns ($P_1 = 1.5 \times K$). Again unknown to the management since they had not been discovered, one other rhino died and whose horns were never recovered. Therefore, the **potential** illegal trade based on discovered and undiscovered carcasses (P_2) was 8 horns ($P_2 = 2 \times K$).

In every field situation there is an acceptable level of 'lost horn', which should vary according to the size of a given rhino population, estimated mortality rates, the size of the area to patrol, habitat type, poaching levels, budgetary constraints, monitoring effort and other variables. Further, it is important to note that it is not so much the actual number of horns recovered (or 'lost horns') that should be monitored, but the number of horns recovered in relation to the size of the rhino population. Despite the effect of the variables mentioned above, it is important to maintain the recommended **minimum levels of horn recovery** from carcasses, to reduce the possibilities of rangers not handing in any collected horn. Such a reporting system combined with other large mammal species in addition to rhinos would also assist in determining whether rhino mortalities were selectively not being recorded.

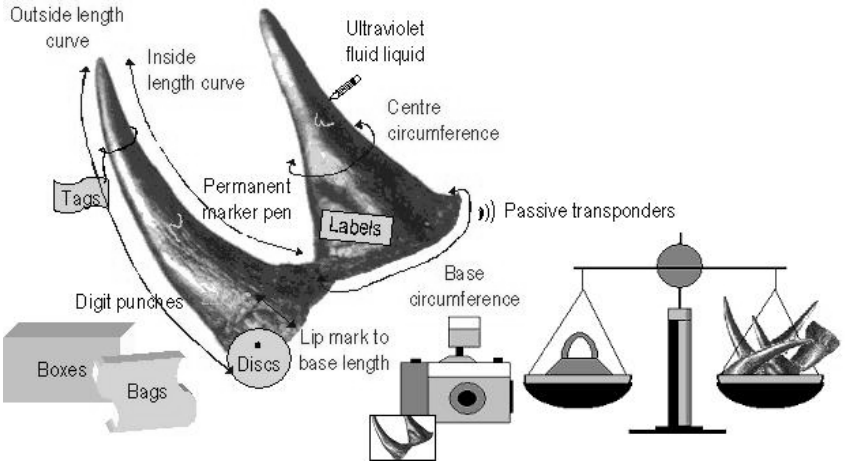
Further, **carcass detection and horn recovery rates** should be monitored to detect any changes and their causal factors. The monitoring of these factors would not only provide a means to reduce the potential for illegal trading by field patrols but also provide a means for managers to proactively monitor patrol effectiveness on a **results-based** system (Figure 4). In this case, the results would include the detection of carcasses, retrieval of horns and establishing the cause of death. Importantly, this results-based monitoring would be far more useful than the more common approach of using effort-based monitoring. For example, many field managers use indices such as the number of patrol days, number of rations or distances travelled per man-hour, to monitor patrol coverage and effectiveness. However, a high number of patrol days may give the wrong impression of coverage if the patrols have been in only one area. Similarly, patrol coverage may look comprehensive but actually be ineffective if rangers are looking in the wrong direction. Used in conjunction with scene of the crime training, results-based patrol monitoring could have a great impact on reducing any illegal trade.

4.3 Horn stockpile management practices

CITES Resolution Conf. 9.14 (Rev.) urges the identification, marking, registration and security all rhino horn stocks' (section 3.2). Throughout the SADC region, a combination of widely differing policies, legislative provisions and accumulation dynamics have given rise to equally widely varying stockpile management practices. There are four main aspects to rhino horn stockpile management: marking and measuring; administration; storage and security; and higher-level mechanisms.

(i) **Marking and Measuring:** There are numerous different ways to measure and mark rhino horns, each of which have their advantages and disadvantages (Figure 6). The importance of marking and measuring horn stock is two-fold. Firstly, it provides a mechanism for identifying individual horns, horns from specific areas and/or or specific sources. Marking and measuring techniques therefore need to be unique, and durable enough to withstand variable transport and storage conditions since they provide the basis for all further administrative requirements including registration.

Figure 6. Marking and measuring techniques for rhino horn

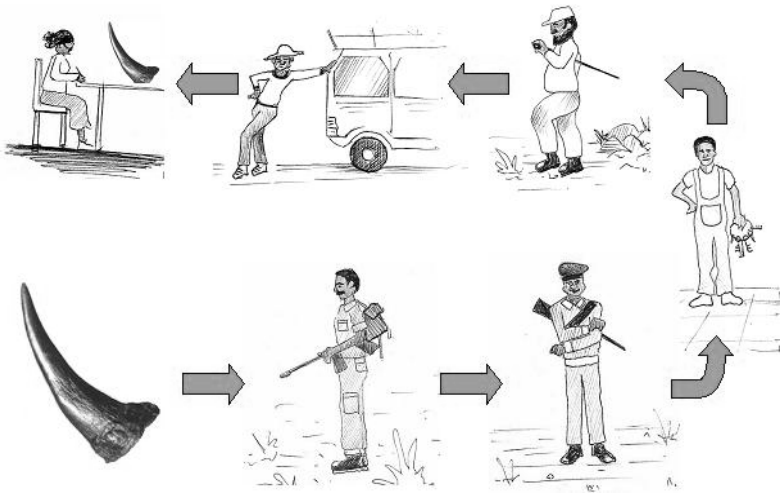


Secondly, marking horns is valuable as a **law enforcement tool**. Since it is possible for horns from stockpiles to end up in illegal trade chains, some discrete marking techniques (e.g. passive transponders and ultraviolet marker pen) can be useful as evidence in determining their origin.

(ii) **Administration:** After marking and measuring horn stocks, adequate record keeping is the next important aspect of horn stockpile management. Good records help reduce the potential for accidental and/or deliberate loss of rhino horn as it is handed between different people, departments and institutions (Figure 3), and provide the basis for higher management level processes such as co-ordination, audits and reconciliation.

As with all aspects of horn stockpile management, there is no one correct answer for every situation and there may indeed be several administrative options for any one particular scenario. Key aspects of administration of horn stockpiles include the type and format of documents used from field to strong room and the details included on these documents. Again, these practices should be useful from both a managerial perspective (e.g. differentiation of horn stocks by area or origin or ownership) and a law enforcement perspective (existence of an auditable trail; Figure 7). Computerisation becomes a necessity as stocks grow beyond a certain size.

Figure 7. Transfer of horn from field to store – the need for auditable trails



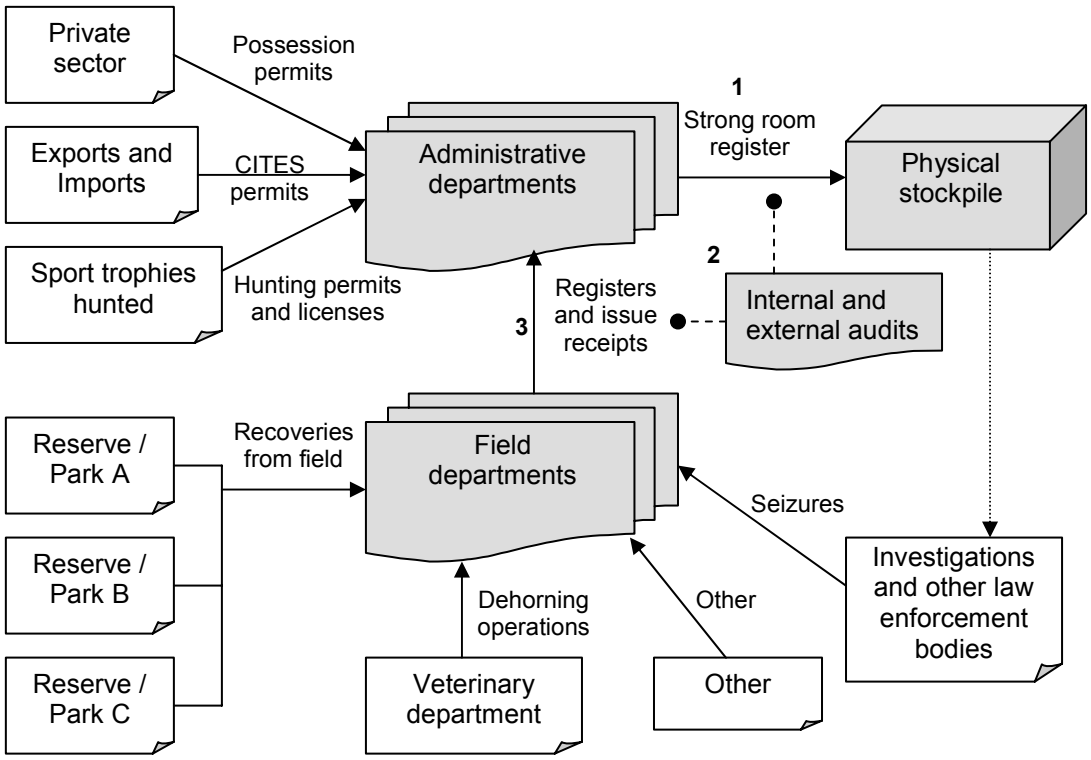
(iii) **Storage facilities and security procedures:** Long-term storage and security are necessary following the marking, measuring and registration of horn. Here lies an anomaly in terms of financial management. Storage and security are the most expensive aspects of stockpile management, which increase as the stockpile size increases whilst the value of the stockpile itself deteriorates over time. Storage facilities include both the security factors associated with strong rooms (e.g. structure, location, access, security, personnel, locks, cameras, log books, etc.) and environmental control (e.g. separation of stocks, treatment, ambient conditions).

(iv) **Higher-level mechanisms:** The critical element to success of all management practices is sustainability. This becomes particularly relevant when conservation budgets and resources become a limiting factor and stockpile management becomes a lower priority. At the highest level, this includes comprehensive policies, procedures and legislative provisions that cover the main aspects of horn stockpile management mentioned above.

Another key element to sustainability is the existence of clear, formal procedures that help to forge the co-ordination necessary between wildlife departments, law enforcement bodies, private sector and others. Similarly, inter-departmental co-ordination is a key component of rhino horn stockpile management, to ensure that audit and reconciliation processes are conducted to ensure all *potential* stocks become *actual* stocks. For example, not only should the stock register match physical stock checks, but also the register should match independent records both at the departmental level (e.g. veterinary department, anti-poaching department, permits and licensing department, biological management department) and individual Park/Reserve level (Figure 8). In this way, rhino horn stockpile reconciliation can act as a platform for other intra-and inter-departmental management practices.

Figure 8. Diagram illustrating three complimentary methods for reconciling stock records:

1. Administrative department records and Physical stockpile inspection
2. Internal and external audits
3. Administrative department records and Field department records



5. CONCLUSIONS

Some of the key elements to ensure continued increases in African rhino numbers lie in adequate protection, sound biological management practices, positive economic incentives and strong partnerships amongst stakeholders. Another key element, often under-recognised, is the need to remove the incentives and possibilities for illegal trade in rhino horn – the greatest threat to wild populations - since this can easily undermine conservation efforts. This becomes particularly relevant when conservation budgets and resources become a limiting factor.

Currently, one of the greatest potentials for supplying rhino horn to illegal trade chains lies within existing and potential horn stocks. In recognition of these facts and CITES Resolution Conf. 9.14 (Rev.), TRAFFIC remains committed to assisting the conservation efforts of SADC countries and regional bodies[5] in implementing effective rhino horn stockpile management. As part of task 2.2-2 of the SADC RPRC, TRAFFIC is undertaking a review of current stockpile management practices in order that examples of good practice may be promoted elsewhere in the region (section 4.3). The potential for results-based patrol monitoring using carcass detection and horn recovery rates are also being investigated in more detail (section 4.2). It is therefore hoped that this introductory paper serves to promote discussion of related topics, and to act as a starting point for ongoing initiatives to improve the security and management of rhino horn stocks in SADC rhino range states.

[5] For example, the Rhino and Elephant Security Group, Rhino Management Group, Interpol, CITES and Lusaka Task Force.